3. COMMENT SUMMARIES AND RESPONSES

This chapter presents summaries and responses to comments the Department of Energy received during the public comment period on the *Draft Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*. Comments received in conjunction with the December 14, 1998, public meeting are also addressed in this chapter.

All comments received during the public comment period are addressed in this chapter. The comments have been summarized and organized under issue categories. Where possible, identical or similar comments provided by more than one commentor are grouped together into one comment summary. The comment summaries also are organized under comment summary-response codes. These codes are keyed to Table 1-7, Comments Sorted by Summary-Response Code, and are presented in numerical order. Responses have been prepared by the Department of Energy (DOE) and the Tennessee Valley Authority (TVA) for each of the comment summaries. These responses indicate whether changes were made to the *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor* (CLWR EIS) and the rationale behind those changes.

The comments summarized under each issue category are listed below each summary. The first numeral in each comment number represents the document or public hearing commentor number, and the second numeral after the dash represents the comment number. These comment numbers can be used in Chapter 2 to locate the original comments. Section 1.3 further describes the organization of this Comment Response Document and discusses the tables provided in Chapter 1 to assist the reader.

CATEGORY 01: POLICY ISSUES

01.01 Several commentors assert that DOE should not produce tritium or nuclear weapons. Other commentors question why nuclear weapons require tritium. One commentor requests that the EIS be withdrawn and that DOE not make a decision to select a new tritium production option. Several commentors express the need to maintain a strong defense.

Comments Summarized: 2-4, 5-2, 7-2, 19-1, 30-2, 110-2, 112-1, 124-2, 136-11 137-2, 207-2, 212-3, 217-1, 223-2, 225-2, 232-6, 248-1, 250-6, 603-2, 702-9, 720-1, 800-6, 825-1

Response: In accordance with Section 91 of the Atomic Energy Act, DOE is required to carry out its atomic weapon activities consistent with the express consent and direction from the President. This express consent and direction is contained in the Nuclear Weapons Stockpile Plan, which is described in Volume 1, Section 1.3.1 and Chapter 2 of this EIS. The issue of whether DOE should produce tritium or nuclear weapons is beyond the scope of the CLWR EIS. Volume 1, Section 1.3.2 of the EIS discusses the tritium requirement for U.S. nuclear weapons. As described in that section, all weapons in the U.S. stockpile require tritium to function as designed. Without tritium, none of the weapons in the stockpile would be capable of functioning as designed, the Nuclear Weapons Stockpile Plan requirements would not be met, and the nuclear deterrent would degrade. Eventually the nuclear deterrent would be lost. The alternative of redesigning weapons to require less or no tritium was evaluated but dismissed from further consideration for the reasons stated in Section 3.1.3 of the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling Programmatic Environmental Impact Statement* (Final Programmatic EIS) (DOE 1995). [See also the

response to Comment Summary 01.03.] DOE acknowledges the commentors' concerns that the United States maintain a strong defense.

01.02 One commentor expresses pleasure that, in making decisions about tritium production, some members of Congress have kept DOE on the steady path of determining what is best for the United States and have supported basing the decision on merit, not politics. One commentor thinks the real battle is yet to come before $2 billion is appropriated by Congress for this project. One commentor suggests that DOE would not get the support of the Alabama delegation if the area doesn't gain anything. Another commentor suggests that, while there is local political support for Bellefonte, it is by no means universal. Another commentor asks whether DOE is aware that the vote on the Markey-Graham Amendment was close and in opposition to the CLWR program.

Comments Summarized: 90-2, 232-2, 700-20, 702-7, 713-3, 806-4

Response: The actions of elected officials are beyond the scope of the CLWR EIS.

01.03 Several commentors contend that DOE does not need tritium because the nuclear weapons will work without tritium, albeit at reduced yields. Another commentor states that, with new treaties limiting multiple-warhead delivery systems to one warhead per delivery system, the additional weight capacity of the delivery systems would allow a heavier warhead that could be designed to deliver the same yield without using tritium. Another commentor suggests that a system whereby the decayed helium and hydrogen could be diverted prior to weapon detonation might be used, thereby negating the need for tritium replenishment.

Comments Summarized: 3-1, 97-1, 110-4

Response: The alternative to redesign weapons to require less or no tritium was considered in Section 3.1.3 of the Final Programmatic EIS (DOE 1995), but dismissed as unreasonable. As explained in that section, the nuclear warheads in the enduring stockpile were designed and built in an era when the tritium supply was assured, when underground testing was being conducted, and when military needs required that the warheads be optimized in terms of weight and volume. Replacing all of these warheads with new ones that would use little or no tritium for the sole purpose of reducing overall tritium demand would not be feasible. Without underground nuclear testing to verify their safety and reliability, new warhead designs could not deviate very far from existing designs, which require the use of tritium. Even with underground testing to facilitate new designs and a fully operational production complex, it would still take many years to build enough nuclear weapons to replace the entire stockpile. Furthermore, the design of a whole new weapons stockpile, the resumption of the underground nuclear testing program necessary to prove the safety and reliability of such a new stockpile, and the redesign of all delivery systems would undoubtedly have severe impacts on negotiating additional bilateral arms reductions.

In regard to the suggestion of adding a new mechanism to purge the helium and hydrogen immediately prior to detonation, nuclear weapons are designed to function using a specified amount of tritium. As explained in Volume 1, Section 1.3.2 of the CLWR EIS, the implosion of the pit along with the onset of the fissioning process heats the deuterium-tritium mixture to the point that the atoms undergo fusion. This is a very intricate and precise process and is dependent upon a specified amount of tritium which interacts with other components specifically designed for such an interaction. Either the specified amount of tritium is present to enable the weapons to be capable of functioning as designed, or it isn't. This is why the tritium reservoirs must be replenished on a regular basis.

01.04 Commentors suggest that production of tritium in a CLWR poses a nuclear proliferation risk. Several other commentors indicate that use of a CLWR to produce tritium violates the Nuclear Nonproliferation Treaty, especially Article VI's commitment to total disarmament. Another commentor indicates that, if the CLWR

program were to influence just one other country to do what is being proposed by the CLWR EIS, the U.S. nuclear nonproliferation effort will be lost. Another commentor states that production of tritium in a CLWR sends a message to other countries that the U.S. intends to keep its nuclear weapons well into the future. Another commentor asks, "What moral authority does the United States have to damn Saddam Hussein for building weapons of mass destruction while we, a signer of the Nonproliferation Treaty, plan to continue production of nuclear weapons?" Another commentor refers DOE to an additional study, *Getting on With Tritium Production: A Report to Speaker Newt Gingrich*, which concluded that CLWR production of tritium does not violate any treaties, laws, or policies. Another commentor states that tritium production is necessary to keep the United States strong while we move forward toward the goal of total nuclear disarmament. One commentor says that the interagency nonproliferation review cited in Section 1.3.5 of the CLWR Draft EIS was either bound by a predetermined outcome or prepared by a group which was astonishingly inept. The same commentor also indicates that the United States is not upholding its obligations under Article VI of the Nonproliferation Treaty by maintaining a very large arsenal into the next century.

Comments Summarized: 32-2, 45-1, 46-1, 48-2, 53-1, 84-7, 89-2, 90-3, 94-6, 99-4, 100-3, 102-2, 109-4, 110-1, 115-3, 119-1, 132-3, 136-6, 137-6, 212-4, 217-2, 235-3, 239-5, 249-2, 250-4, 501-14, 503-1, 600-2, 604-2, 700-15, 702-11, 707-5, 712-7, 713-4, 800-5, 803-6 805-1, 829-3

Response: The issue of nonproliferation is addressed in Volume 1, Section 1.3.5 of the CLWR EIS. As explained in that section, in order to fully investigate the potential impacts of the CLWR proposal on nonproliferation efforts, a high-level interagency review was conducted. That effort resulted in the July 14, 1998, issuance of the *Interagency Review of the Nonproliferation Implications of Alternative Tritium Production Technologies Under Consideration by the Department of Energy, A Report to the Congress* (DOE 1998b). This report, prepared by top Administration officials from various government departments including the Department of Defense, the Department of State, and the Department of Energy, concluded that any nonproliferation issues associated with the use of a CLWR to produce tritium were manageable and that DOE should continue to pursue the CLWR option. The review further concluded that there are no legal or treaty prohibitions against tritium production in a CLWR; reactors making tritium can remain on the International Atomic Energy Agency (IAEA) Safeguards List; and no bilateral "peaceful uses" agreements would be violated so long as unrestricted fuel and components are used.

In regard to the Nuclear Nonproliferation Treaty, nowhere does it specifically refer to tritium. Under the Treaty, parties agree not to transfer nuclear weapons or other devices or control over them, and not to assist, encourage, or induce nonnuclear states to acquire nuclear weapons. Production of tritium in a CLWR by a nuclear weapons state in no way conflicts with such an agreement.

In regard to the U.S. use of CLWRs to produce tritium and the influence this action might have on enticing other countries to do the same, production of tritium in a CLWR fully supports the goals of Article VI of the Nuclear Nonproliferation Treaty, in which signatory nations agree to work toward total disarmament. Since the end of the Cold War, the United States has significantly reduced the size of its nuclear weapons stockpile and DOE has dismantled more than 12,000 nuclear weapons. At the present time, the United States is further downsizing the nuclear weapons stockpile consistent with the terms of the Strategic Arms Reduction Treaty I (START I), and DOE is continuing its dismantlement activities. The United States has ratified the START II Treaty and is hopeful Russia will do likewise. Negotiations required for further reductions will stretch well into the next century, and tritium production in a CLWR to support a reduced nuclear weapons stockpile, while the United States actively pursues further nuclear weapons reductions agreements, is consistent with the long-range goal of total nuclear disarmament.

The United States is a declared weapons state, and the purpose of nonproliferation efforts is to keep nonweapons states from acquiring nuclear weapons while weapons states work towards the longer term goal

of achieving total nuclear disarmament. Other declared nuclear weapons states already produce tritium in reactors that also produce electricity for commercial use. Nonweapons states which have agreed not to manufacture nuclear weapons are not likely to be encouraged to do so as a result of the U.S. decision to produce tritium in a CLWR. As for rogue states bent on obtaining nuclear weapons at any cost, it is doubtful that U.S. production of tritium in a CLWR will have any influence on their nuclear weapons endeavors.

In regard to the commentor who referred DOE to *Getting on with Tritium Production: A Report to Speaker Newt Gingrich,* dated September 29, 1995, the Department has reviewed this document and is aware of this report's finding that production of tritium in a CLWR would not violate any treaties, laws, or policies.

01.05 The commentor wonders whether the Interagency Review Panel (on nonproliferation issues associated with CLWR tritium production), the Department of Energy, etc., have decided it is permissible for India, Iraq, and North Korea to produce tritium in their commercial reactors for use in nuclear weapons.

Comment Summarized: 702-8

Response: No. The goal of the Nuclear Nonproliferation Treaty is to prevent nations such as Iraq, North Korea, and India from having a nuclear weapons program at all, regardless of where materials might be made.

01.06 The commentor wants additional clarification concerning the statement in Section 1.3.5(3) of the CLWR Draft EIS that any reactors used to produce tritium would "remain eligible for IAEA safeguards." The commentor also asks for an explanation of the safeguards provided by the IAEA.

Comments Summarized: 94-7, 811-1

Response: The TVA reactors will remain on the U.S. list of facilities eligible for IAEA safeguards. Under the 1980 U.S./IAEA Safeguards Agreement, the United States has sole authority to decide which U.S. facilities are eligible for safeguards and the IAEA has sole authority to decide which eligible facilities will be selected for safeguards. Although the IAEA does not monitor the production of tritium, the IAEA has advised the U.S. government that the use of any CLWR to produce tritium would not preclude the IAEA from applying safeguards at such facilities. All relevant U.S. agencies have agreed that, if tritium is produced at a TVA facility, the TVA facility will be maintained on the list of installations eligible for IAEA inspection.

IAEA safeguards are designed to safeguard the flow of special nuclear and source material under the U.S./IAEA Agreement and to detect the withdrawal of significant quantities of nuclear material from activities while such material is being safeguarded. Safeguard procedures are based upon material accountancy with containment and surveillance as important complementary measures. Material control system records and design information are made available to the IAEA for examination and verification. The IAEA may make routine, ad hoc, or special inspections to verify information received. During inspections, the IAEA may make use of statistical techniques and random sampling in evaluating the flow of nuclear material.

01.07 The commentor states that the CLWR Draft EIS indicates that DOE would provide blended-down highly enriched uranium to be used for reactor fuel. The commentor believes that such a use of weapons material is inappropriate, as the Department has already acknowledged by removing such a proposal from the *Storage and Disposition of Weapons — Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE 1996). Another commentor asks why DOE cannot use "off-spec" blended-down highly enriched uranium at Sequoyah for tritium production.

Comments Summarized: 94-24, 803-2

Response: DOE has amended the language in Volume 1, Section 5.2.7 of the CLWR EIS to indicate that any highly enriched uranium provided by DOE for downblending into CLWR fuel would come from highly enriched uranium set aside for national security purposes, and would not come from highly enriched uranium that has been declared excess to weapons needs.

"Off-spec" blended-down highly enriched uranium is material that does not meet the standard specifications for commercial nuclear reactor fuel. The fuel contains higher than usual amounts of a material that inhibits the fission process. "Off-spec" fuel still can be used in nuclear fuel if the fuel is at a somewhat higher commercial fuel enrichment level. While there is no legal prohibition, using "off-spec" highly enriched uranium in a tritium production reactor could be judged to be inconsistent with U.S. commitments to refrain from using the material to manufacture nuclear weapons.

01.08 The commentor requests information on the Congressional or Presidential positions on nonproliferation at the time Atomic Energy Commission regulatory authority was given to the U.S. Nuclear Regulatory Commission (NRC) and the rest of the military support mission was given to the Energy Research and Development Administration (and then to DOE).

Comment Summarized: 4-7

Response: The delegation of Atomic Energy Commission regulatory authority for commercial reactors to the NRC and the delegation of the remaining Atomic Energy Commission authority to the Energy Research and Development Administration (and then to DOE) did not constitute a policy decision to separate commercial power from weapon production.

01.09 Commentors contend that it goes against long-standing national policy to produce materials for nuclear weapons at a commercial facility. Several commentors indicate that the nonproliferation study referred to in the CLWR Draft EIS only addresses military-to-civilian instances, and that this is not the same as civilian-to-military—that crossing the line from military-to-civilian use of a reactor is not remotely comparable to crossing the line the other way. Additional commentors state that it would be hypocritical for the United States to manufacture tritium in a CLWR while at the same time formally trying to prohibit other countries such as India, Pakistan, or North Korea from doing the same thing. Another commentor believes that a CLWR is not capable of serving "two masters," i.e., operating in both a civilian and military mode at the same time. Another commentor states "Use of a commercial plant to produce weapons material would set a precedent for Iraq, China, and any other country to disguise weapons development as civilian activity." Another commentor indicates that Section 57.e of the Atomic Energy Act prohibits the government from using commercial nuclear power plants to facilitate the development of nuclear weapons. Another commentor states that it is disingenuous of DOE to pretend it misunderstood the public's concern, and that it is absurd to imagine the United States would threaten another nuclear power to prevent them from converting a military installation to a peaceful purpose or would disable their efforts to use military technology for civilian purposes. This commentor states the real concern always has been that nations would be able to disguise weapons development as civilian activity, and this is precisely what DOE is proposing with the CLWR program. Another commentor states that producing tritium in a commercial reactor is "illegal and counterproductive to life on earth."

Comments Summarized: 2-1, 4-8, 6-3, 7-1, 9-1, 13-5, 14-1, 20-1, 25-4, 32-1, 41-1, 44-11, 51-1, 52-1, 95-1, 99-1, 100-4, 102-1, 110-5, 113-1, 117-1, 120-2, 124-1, 132-5, 135-1, 136-7, 206-1, 207-1, 208-3, 218-1, 235-2, 239-2, 245-1, 250-3, 501-15, 504-1, 505-1, 700-16, 707-6, 817-2, 824-1, 828-1, 829-2

Response: There is no U.S. policy, law, or treaty that prohibits the production of tritium which will ultimately be used in weapons in a commercial reactor. Although Section 57.e of the Atomic Energy Act of 1954, as

amended, prohibits the use of special nuclear materials produced in an NRC-licensed facility (a commercial reactor), tritium is not considered a special nuclear material as defined by Section 11.aa of the Atomic Energy Act.

Additionally, production of tritium in a U.S. commercial reactor is not inconsistent with U.S. opposition to such production by India, Pakistan, or North Korea. The United States is a declared weapons state, and the purpose of the nonproliferation efforts is to keep nonweapons states from acquiring nuclear weapons while weapons states work toward the longer-term goal of achieving total nuclear disarmament. In addition, several other nations operate dual-purpose reactors which serve both civilian and military needs.

The commentors are correct in that the CLWR Draft EIS only gives examples of military-to-civilian joint uses of reactors. The CLWR Final EIS has been amended to include examples of civilian-to-military joint uses of reactors. These additional examples of civilian-to-military uses may be found in Volume 1, Section 1.3.5 of the CLWR EIS.

In regard to the ability of a CLWR to operate in both a civilian and military capacity at the same time, the tritium-producing burnable absorber rods (TPBARs), as described in Volume 1, Section 3.1.2, replace the existing burnable neutron absorber rods of a normal reactor operation. They absorb excess neutrons and extend fuel life in the same way as the burnable absorber rods they replace. TPBARs do not affect the normal operation of the reactor, but they produce tritium, all of which is internally captured in the TPBAR getter.

01.10 Commentors allege that tritium should not be produced in a CLWR because the use of nuclear weapons is morally and ethically wrong. Another commentor alleges that moral and ethical issues are already present in abundance in the CLWR Draft EIS and, while uncomfortable to contemplate and difficult to quantify, they deserve full consideration throughout this decisionmaking process. Another commentor states that security will be generated not by nuclear energy and nuclear weapons, but by developing a reverence for life.

Comments Summarized: 84-5, 94-27, 136-8, 223-3, 248-5, 501-16, 603-3, 702-17, 712-4

Response: The CLWR EIS assesses the potential environmental impacts associated with tritium production at one or more CLWRs. While one could opine that moral and ethical issues are integral to every issue addressed in an EIS, the focus of an EIS is on potential environmental impacts. Strictly moral and ethical issues are outside the scope of the CLWR EIS.

01.11 The commentor expresses disappointment that the Senate approved CLWRs for tritium production, but is pleased that DOE will not receive funding for it in Fiscal Year 1999. The commentor also expresses hope that DOE will be more thorough in considering the CLWR Program's impact on national and international obligations, human health, and the environment.

Comment Summarized: 102-5

Response: The commentor is referred to Volume 1, Chapter 1 for a discussion of a number of national and international concerns, and to Chapter 5 for a thorough evaluation of the environmental consequences of the proposed action.

01.12 The commentor asks why DOE and the Federal Government are moving so quickly on tritium production, and why Secretary Richardson believes he has to make the technology decision before the end of the calendar year.

Comments Summarized: 212-2, 235-4, 704-6, 829-4

Response: All nuclear weapons in the United States stockpile must contain tritium to be capable of performing as designed. Because it decays, the tritium contained in nuclear weapons must be replenished periodically. The United States has not produced new tritium since 1988. International arms control agreements in recent years have led to reductions in the size of the nuclear weapons stockpile. This, in turn, has allowed DOE to recycle tritium from dismantled weapons for use in the remaining stockpile. However, due to the decay of tritium, the current inventory of tritium will not be sufficient to meet national defense requirements past approximately 2005. The most recent Presidential direction, which is contained in the 1996 Nuclear Weapons Stockpile Plan and an accompanying Presidential Decision Directive, mandates that new tritium must be available by approximately 2005 if a CLWR is the selected option for tritium production. In order for DOE to obtain tritium from a CLWR by that date, it is necessary first to make the CLWR tritium technology decision by December 1998, as mandated by the Fiscal Year 1998 Authorization Act. Subsequent to the tritium technology decision, the following events would need to occur before approximately 2005: (1) TPBARs must be fabricated; (2) an NRC license amendment to allow irradiation of the TPBARs in a CLWR must be obtained; (3) TPBARs must be irradiated in a CLWR, removed, and cooled; (4) irradiated TPBARs must be transported to the Savannah River Site; and (5) tritium must be extracted at the proposed Tritium Extraction Facility at Savannah River.

01.13 The commentor asks for a definition of special nuclear material and wants to know why tritium is not a special nuclear material.

Comments Summarized: 212-5, 807-1

Response: As indicated in Volume 1, Chapter 10, the Glossary, "special nuclear material" is defined in Section 11 of the Atomic Energy Act of 1954. Accordingly, special nuclear material means: (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the NRC determines to be special nuclear material; or (2) any material artificially enriched by any of the foregoing. Section 51 of the Atomic Energy Act further states that, "The Commission [i.e., NRC] may determine from time to time that other material is special nuclear material in addition to that specified in the definition as special nuclear material. Before making such determination, the Commission must find that the determination that such material is special nuclear material is in the interest of the common defense and security, and the President must have expressly assented in writing to the determination."

The NRC has not classified tritium as special nuclear material. Tritium, therefore, is not legally classified or regulated as special nuclear material under the Atomic Energy Act.

01.14 The commentors suggest that DOE could buy tritium from either Russia or Canada. One commentor notes that, if money alone is the issue, DOE could buy tritium from Russia; however, this commentor felt that such a move would leave our weapons program vulnerable to a foreign power. Another commentor points out that 14 kilograms of tritium have been extracted in Canada since 1988 and suggests that DOE should acquire it at $30,000 per gram rather than produce it.

Comments Summarized: 240-2, 241-1, 253-1, 811-4

Response: In the Final Programmatic EIS (DOE 1995), DOE considered the purchase of tritium from other sources, including foreign nations. Conceptually, the purchase of tritium from foreign governments could fulfill the tritium requirement. However, while there is no national policy against purchase of defense materials from foreign sources, DOE determined that the uncertainties associated with obtaining tritium from foreign sources rendered this alternative unreasonable for an assured long-term supply. Consequently, in this tiered CLWR EIS, the purchase of tritium from foreign sources is still considered an unreasonable alternative.

01.15 Several commentors feel that the Vice President's office has influenced this decision and has been too involved in moving TVA's agenda. They believe that this will compromise the Vice President's ability to stand before the world community in the future and argue against weapons of mass destruction if he is elected to a higher office. Another commentor suggests that the Vice President's support of the proposed action will damage his chances in the 2000 presidential election.

Comments Summarized: 249-3, 802-5, 803-7, 811-8

Response: Energy Secretary Bill Richardson announced that the CLWR will be the primary technology for tritium production because it is a proven technology; it has the flexibility to meet a range of future needs; and it is the best deal for the taxpayer. He also explained that the Watts Bar and Sequoyah plants are the Preferred Alternative because they would provide tritium when needed, at cost, without a large capital expense. The political aspirations of the Vice President are beyond the scope of the CLWR EIS.

CATEGORY 02: PURPOSE AND NEED FOR TRITIUM

02.01 Several commentors question the need for tritium. One commentor asserts that, "DOE claimed in 1988 that national security would be jeopardized if tritium production did not resume swiftly, however, no crisis has resulted." Several commentors state that the United States should shift away from a dependency on nuclear weapons. Other commentors question the need for nuclear weapons and whether the United States needs as many nuclear weapons as it has. Several commentors assert that the United States should be reducing its nuclear weapons stockpile, rather than producing more tritium.

Comments Summarized: 2-2, 5-1, 6-1, 9-2, 13-3, 20-2, 21-1, 47-1, 48-1, 53-2, 94-5, 108-3, 109-2, 111-1, 112-4, 119-2, 122-1, 125-1, 137-4, 208-2, 235-1, 239-3, 248-3, 249-1, 507-1, 700-13, 803-11, 806-8, 817-3, 825-3, 829-1

Response: Since the end of the Cold War, the United States has significantly reduced the size of its nuclear weapons stockpile and DOE has dismantled more than 12,000 nuclear weapons. At the present time, the United States is further downsizing its nuclear weapons stockpile, consistent with the terms of the START I Treaty, and DOE is continuing dismantlement. The United States ratified the START II Treaty and is hopeful that Russia will do likewise. Additionally, the United States is committed to further weapons reduction in accordance with the Nonproliferation Treaty. As stated in Volume 1, Section 1.3.3 of the CLWR EIS, reductions in the size of the nuclear weapons stockpile, brought on by international arms control agreements, have enabled DOE to fulfill its tritium requirements by recycling tritium removed from weapons. This source of tritium is presently being utilized and already has been factored into the tritium requirement projections, which indicate a need for a new supply of tritium by approximately 2005. While future arms control reductions may change the requirements, DOE is responsible for meeting the current requirements set forth by the President. The need for nuclear weapons and the issue of how many nuclear weapons the United States should maintain in its nuclear deterrent are beyond the scope of the CLWR EIS. The need for a new tritium supply is explained in Volume 1, Chapter 2 of the CLWR EIS. [See also the response to Comment Summary 02.02 for additional information.]

02.02 Several commentors question the need for tritium by 2005. One commentor specifically questions whether the 2005 date comes from the Presidential directive or from DOE's extrapolation from the Presidential directive. Several commentors assert that DOE does not need tritium until 2016 to maintain START II levels and, by then, the United States likely will need less tritium due to additional multilateral stockpile reductions. Several commentors also opine that a scenario of 1,000 warheads would be more than enough for national defense and this scenario would not require additional tritium until 2032. One commentor questions how it

is possible that tritium is needed by 2005 for the CLWR alternative, but not until 2007 for the accelerator alternative. The commentor asserts that the need date for tritium should be independent of the tritium supply source.

Comments Summarized: 84-6, 94-2, 99-2, 100-2, 110-3, 115-4, 116-9, 132-4, 136-9, 137-5, 250-2, 604-1, 700-11, 704-8, 707-3, 712-5

Response: As discussed in Volume 1, Chapter 2 of the CLWR EIS, the need for a new tritium supply is based on the 1996 Nuclear Weapons Stockpile Plan and an accompanying Presidential Decision Directive. The approximate 2005 date comes directly from the Presidential Decision Directive, not from DOE's extrapolation from the Presidential Decision Directive. The 1996 Nuclear Weapons Stockpile Plan, which represents the latest official guidance for tritium requirements, is based on a START I-level stockpile size of approximately 6,000 accountable weapons. A Nuclear Weapons Stockpile Plan for 1997 and 1998 was not issued. The potential impacts of future arms control agreements were accounted for in the development of the 1996 Nuclear Weapons Stockpile Plan. Commentors' assertions that new tritium is not needed until 2016 are erroneous and are not based on the current Nuclear Weapons Stockpile Plan requirements. The issue of whether a stockpile of 1,000 warheads would be more than enough to secure national defense is beyond the scope of the CLWR EIS. The purpose of the CLWR EIS is to evaluate the environmental impacts of the reasonable CLWR alternatives for providing the tritium necessary to support the enduring stockpile, as defined by the President in the Nuclear Weapons Stockpile Plan. Concerning whether the need for tritium is independent of the supply source, the reason the year 2007 was mandated for accelerator tritium production is that is the earliest date by which the accelerator could be built and begin operation. In such a case, tritium requirements from approximately 2005 until 2007 would have been met by withdrawals from the tritium reserve. The tritium reserve then would have been replenished by producing tritium quantities greater than the decay requirements. The Secretary's December 22, 1998, announcement that the CLWR would be the primary supply tritium technology means that DOE will not have to withdraw from the tritium reserve.

CATEGORY 03: TRITIUM REQUIREMENTS

03.01 Several commentors opine that the classified tritium requirements should be declassified. One commentor states that a meaningful review of the CLWR EIS is not possible due to the classification issues. Another commentor asserts that DOE is hiding behind classifications and that the citizenry should be entitled to the same information as DOE. Lastly, one commentor opines that, if the tritium requirements were declassified, they would show that tritium is not needed as soon as DOE claims. Another commentor is not willing to risk national security to declassify tritium requirements.

Comments Summarized: 700-12, 704-4, 719-1

Response: Tritium requirements are classified to protect national security. While DOE's philosophy is to disclose as much information to the public as possible, this does not include classified information. Volume 1, Chapter 2 of the CLWR EIS provides unclassified information regarding the tritium requirements. As discussed in that chapter, the President directed DOE to provide a new tritium supply source by approximately 2005 in order to meet the requirements set forth in the most recent Nuclear Weapons Stockpile Plan. The unclassified tritium requirements information presented in Chapter 2 is consistent with the classified tritium requirements.

03.02 Commentors question whether the Bellefonte plant could meet tritium requirements by approximately 2005. Commentors further question what would happen if Bellefonte were not on line in time to support the tritium requirements.

Comments Summarized: 500-2, 502-2

Response: If TVA were not able to provide the necessary tritium by approximately 2005 using Bellefonte Unit 1, then TVA would produce tritium in Watts Bar 1 and/or Sequoyah 1 and/or 2 to meet the tritium requirements.

03.03 Several commentors state that the CLWR Draft EIS is unclear about the number of TPBARs and the number of reactors required to meet tritium demands. One commentor states that the CLWR EIS should explain that 3 kilograms of tritium is the surge goal and that the "day-in, day-out goal is something lower." One commentor questions why DOE needs 40 years of tritium production at 3 kilograms per year.

Comments Summarized: 44-7, 45-7, 86-13, 116-10, 501-9, 503-11, 504-4, 700-6, 703-3

Response: As described in Volume 1, Section 3.2.1 of the EIS, the CLWR program is being designed to produce up to 3 kilograms of tritium per year. The text in Section 3.2.1 has been modified to clarify that 3 kilograms of tritium represents an unclassified maximum requirement that only would be required if the tritium reserve were ever lost/used. Producing up to 3 kilograms of tritium would involve the irradiation of up to 6,000 TPBARs in an 18-month cycle. The maximum number of TPBARs that could be irradiated in a single reactor without significantly disrupting the normal electricity-producing mode of operation is approximately 3,400 TPBARs per each 18-month cycle. Consequently, producing 3 kilograms of tritium without significantly disrupting the normal electricity-producing mode of operation would require more than one reactor. It should be noted, however, that producing 3 kilograms of tritium per year likely would be a short-term requirement to reconstitute the tritium reserve. In such a case it is technically feasible to produce larger quantities of tritium in a single reactor by changing some of the design parameters of the TPBARs and/or some of the technical parameters of the host reactor, including shortening the operating cycle. Volume 1, Section 5.2.9 of the EIS addresses the environmental impacts associated with such a case. However, DOE does not foresee the implementation of this mode of production in any of the reactor units considered in the CLWR EIS. Regarding why the EIS evaluates a 40-year period, this represents the operational life of the new tritium production source (as presented in Volume 1, Chapter 2 and Section 3.2.1 of the EIS). Forty years was selected for several reasons: (1) it is consistent with the period of analysis analyzed in the Accelerator Production of Tritium (APT) EIS (DOE 1997b, DOE 1999a) (thus facilitating a common basis comparison between the two technologies); (2) it is the length of time for the NRC's initial operating license for nuclear power plant operation; and (3) it represents a bounding period of time to ensure that the CLWR EIS assesses all reasonably foreseeable impacts. However, because the Nuclear Weapons Stockpile Plan requirements do not extend beyond an 11-year period (see Volume 1, Section 1.3.1 of the EIS), the 40-year time period for analysis does not purport to translate into national security requirements beyond the Plan's requirements.

03.04 The commentor, citing the 2.5 kilogram requirement, asks how many reactors would be needed. The commentor asks whether the Bellefonte option refers to Bellefonte only, or Bellefonte and another reactor, and whether two reactors would be used for tritium production in all cases. The commentor asks where in the CLWR Draft EIS does it mention a 12-month cycle for tritium production at Bellefonte. The commentor also asks whether DOE submitted materials to the NRC for review, and whether the NRC is reviewing the 12-month cycle option.

Comment Summarized: 808-3

Response: As discussed in Volume 1, Section 3.2.1 of the CLWR EIS, for the purposes of the analysis DOE assumed that the CLWR program would be designed to produce up to 3 kilograms of tritium per year. Steady-state tritium requirements, which are classified and would vary depending upon the specific requirements of the Nuclear Weapons Stockpile Plan, are less than 3 kilograms of tritium per year. Considering the current design of the TPBARs and the efficiency of the tritium extraction process, the analysis assumption of 3

kilograms of tritium per year would involve the irradiation of up to 6,000 TPBARs in an 18-month refueling cycle. Since the maximum number of TPBARs that could be irradiated at each reactor unit without significantly disturbing the electricity-producing mode is 3,400 TPBARs, more than one reactor unit would be needed to satisfy the analysis assumption. The combinations of reactor units that could be used for tritium production form the reasonable alternatives discussed in Section 3.2.3 of the CLWR EIS. It is technically feasible to produce larger quantities of tritium by changing some of the design parameters of the TPBARs and some technical parameters of the host reactor, including shortening the refueling cycle. Volume 1, Section 5.2.9 addresses the environmental impacts associated with such a case.

The NRC is currently reviewing a topical report titled, *Tritium Production Core Topical Report*, (WEC 1998). The NRC is not reviewing anything regarding the length of the operating cycle.

CATEGORY 04: OTHER TRITIUM PRODUCTION OPTIONS

04.01 Several commentors express support for the APT at the Savannah River Site and opine several advantages of the APT over CLWR production of tritium. One commentor questions whether DOE thinks that tritium production in an accelerator is straightforward and safe. Commentors also request a comparison of the technical risks associated with the CLWR and APT options. The commentor asks whether the technical risks for the two options will be included in the CLWR Final EIS or only in the final decision. Commentors also express opposition to an APT at the Savannah River Site.

Comments Summarized: 1-1, 6-2, 16-1, 18-1, 43-1, 45-4, 90-6, 135-2, 139-2, 501-1, 503-7, 701-1, 713-7

Response: DOE acknowledges that there is both support for and opposition to the APT at the Savannah River Site, which is the programmatic No Action Alternative to the CLWR program. The purpose of the CLWR EIS is to evaluate the environmental impacts of the reasonable CLWR alternatives for providing the tritium necessary to support the enduring stockpile, as defined by the President in the Nuclear Weapons Stockpile Plan. For completeness, Volume 1, Section 5.2.11 and Table 3-14 of the CLWR EIS provide a summary of the environmental impacts associated with tritium production at an APT at the Savannah River Site. Specific questions about APT safety and technology challenges are addressed in the APT EIS (DOE 1997b, DOE 1999a).

04.02 One commentor expresses support for a small advanced heavy water reactor for tritium production that could be built at the Savannah River Site. The commentor opines that such a device would be the least costly tritium production alternative, as well as the safest, most efficient, and most environmentally-sound.

Comments Summarized: 14-3, 504-3

Response: As discussed in Volume 1, Section 1.1.3, the CLWR EIS is a tiered document which follows the Record of Decision for the Final Programmatic EIS (60 FR 63878). As such, the scope of the CLWR EIS is limited to evaluating the environmental impacts of the reasonable CLWR alternatives for providing the tritium necessary to support the enduring stockpile. Reactor alternatives that are not CLWRs are not reasonable alternatives for the CLWR EIS. The Final Programmatic EIS evaluates the full range of reasonable technology alternatives for tritium supply. A heavy water reactor was one of the reasonable alternatives evaluated. In addition, Section A.3.1 of the Final Programmatic EIS described the potential technology innovations that might be incorporated into any of the reactor alternatives. For the heavy water reactor, the Final Programmatic EIS described the potential technology innovations associated with a small advanced heavy water reactor. As explained in the Comment Response Document (Volume III of the Final Programmatic EIS), if the heavy water reactor were chosen in the Record of Decision, "site-specific analysis would consider these types of

improvements." However, in the Record of Decision, DOE did not choose to build any new reactors and did not choose the heavy water reactor technology. Consequently, no site-specific analysis of a small advanced heavy water reactor has been done.

04.03 Commentors request DOE to provide tables comparing the environmental impacts of the CLWR and APT options and the Tritium Extraction Facility. Another commentor questions how much of the APT costs would be for design and how much would be for construction.

Comments Summarized: 4-9, 44-2, 501-4

Response: An environmental impact comparison table comparing the CLWR and APT options was provided to the individual who made this comment at the Savannah River Site public hearing, and the CLWR Final EIS has added a comparison of impacts table as suggested (see Volume 1, Chapter 3, Table 3-14). The costs associated with the APT are contained in the official cost estimates which DOE made available at the public hearings (DOE 1998c). Costs of the APT and the Tritium Extraction Facility are beyond the scope of the CLWR EIS.

04.04 One commentor questions why the option of simultaneously burning mixed oxide fuel and producing tritium in the same reactor was not discussed in the CLWR Draft EIS. Another commentor opines that burning uranium and mixed oxide fuels is not an acceptable way to deal with the waste. Another commentor asks TVA and DOE to guarantee that mixed oxide fuel will never be used at Bellefonte.

Comments Summarized: 127-2, 623-1, 707-16

Response: As explained in Volume 1, Appendix F, Table F-3 of the CLWR EIS, TVA officials stated at the public scoping meeting in Evensville, Tennessee, on February 26, 1998, that TVA has no intention of pursuing the use of mixed oxide fuel at any TVA reactor that would be utilized for tritium production. Consequently, the potential impacts associated with producing tritium while also burning mixed oxide fuel are not reasonably foreseeable. The issue of burning uranium and mixed oxide fuels is not within the scope of the CLWR EIS.

04.05 The commentor states that he does not believe the summary of the APT Draft EIS (CLWR Draft EIS, Section 5.2.11) captures the most significant impacts regarding dewatering and the presence of radium and tritium contamination, as described in the APT Draft EIS, Section 3.3.2.2. The commentor also references a previous EIS from DOE that resulted in the U.S. Environmental Protection Agency (EPA) expressing concern about the lack of assurance that proposed operations would not lead to further adverse impacts. Volume 1, Section 5.2.11 of the CLWR Draft EIS states that the APT would produce neutrons that have the potential to penetrate shielding and be absorbed by the soil and groundwater. This indicates that there would be an adverse impact from operation of the facility and, based on the EPA's previous concern, DOE should address the impacts from the APT in the CLWR Final EIS.

Comment Summarized: 89-3

Response: As stated in the CLWR EIS, Section 5.2.11 presents a summary of the environmental impacts of the APT. For a more detailed analysis of these potential impacts, the reader is referred to the APT EIS (DOE 1997b, DOE 1999a). The APT EIS has been incorporated into the CLWR EIS by reference. DOE has included in the CLWR EIS a summary of the most significant potential impacts from the APT. It is beyond the scope of the CLWR EIS explicitly to address the impacts or the mitigation actions resulting from the programmatic No Action Alternative, which is the construction and operation of the APT at the Savannah River Site.

CATEGORY 05: NEPA PROCESS

05.01 One commentor questions the reason for the linkage between the CLWR EIS, the APT EIS, and the Tritium Extraction Facility EIS.

Comments Summarized: 4-5, 44-1

Response: The Preface to the CLWR EIS clarifies the relationship between the CLWR EIS, the APT EIS, and the Tritium Extraction Facility EIS. The Preface also includes the announcement Secretary Richardson made on December 22, 1998 (DOE 1998d). Based on that announcement, DOE now intends to produce tritium in CLWRs. The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. A new tritium extraction capability would be sited at the Savannah River Site to extract tritium from CLWR TPBARs. The December 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) provides the programmatic umbrella for the site-specific actions assessed in the CLWR, APT, and Tritium Extraction Facility EISs. As tiered National Environmental Policy Act (NEPA) documents, these EISs analyze the site-specific environmental impacts of implementing the actions proposed in each. In the Final Programmatic EIS, the environmental impacts of all three of these projects were analyzed collectively. In addition, this CLWR EIS presents a summary of the environmental impacts of the APT at the Savannah River Site (see Volume 1, Section 5.2.11 and Table 3-14) and the impacts of the tritium extraction facility at the Savannah River Site (see Section 5.3.4). The APT and Tritium Extraction Facility EISs have been incorporated into the CLWR EIS by reference.

05.02 Two commentors question whether there is a "real no action alternative" for either the CLWR EIS or the APT EIS. Another commentor states that it is very difficult to understand the decisions that DOE is talking about, particularly when the EIS does not provide the reader with the no-action effects and merely tiers them off to some other document.

Comments Summarized: 4-6, 501-5, 700-14

Response: The No Action Alternatives for the CLWR EIS and the APT EIS tier from the original December 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878). As explained in Volume 1, Section 3.2.4 of the CLWR EIS, based on that Record of Decision, if tritium is not produced in a CLWR, it will be produced in an accelerator. This approach is consistent with guidance from the Council on Environmental Quality, which states that, "the no action alternative may be thought of in terms of continuing with the present course of action until that action is changed," (see 46 FR 18026). In the December 1995 Record of Decision for the Final Programmatic EIS, the Secretary determined that DOE would produce tritium either in a CLWR or in an APT at the Savannah River Site. The CLWR EIS No Action Alternative is not to produce tritium in any of the TVA reactors. However, the alternative of not producing tritium (which DOE has interpreted the commentor's question of a "true no action alternative" to mean) was analyzed in Section 3.2.1 of the Final Programmatic EIS. Neither the Record of Decision for the Final Programmatic EIS nor the Secretary's announcement on December 22, 1998, selected this No Action Alternative.

05.03 The commentor suggests that the 1995 Record of Decision for the Final Programmatic EIS be re-opened and re-evaluated based on information available today. The commentor advocates that DOE design, construct, and operate two different tritium facilities at different sites to ensure redundancy, with one of the facilities designed for electricity production.

Comment Summarized: 41-7

Response: On December 22, 1998, Energy Secretary Richardson announced that DOE now intends to produce tritium in CLWRs (DOE 1998d). The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. The Secretary's announcement that the CLWR would be the primary tritium supply technology reaffirms the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) to construct and operate a new tritium extraction capability at the Savannah River Site. The Secretary considered issues such as cost, technical realities, environmental impacts, policy, and statutory requirements in making that announcement. DOE intends to issue a consolidated Record of Decision in April 1999 (see also the Preface to the CLWR EIS).

05.04 One commentor states that the information on the primary and backup tritium sources is difficult to understand—particularly the elements DOE requires as a facility and a backup and what that really means to public citizens. Another commentor questions when DOE will select either of the tritium supply dual tracks described in the CLWR EIS.

Comments Summarized: 44-3, 501-2, 702-3

Response: On December 22, 1998, Energy Secretary Richardson announced that DOE now intends to produce tritium in CLWRs (DOE 1998d). The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. The Secretary's announcement that the CLWR would be the primary tritium supply technology reaffirms the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) to construct and operate a new tritium extraction capability at the Savannah River Site. Volume 1, Section 1.5.1.1 of the CLWR EIS has been revised to clarify the issue of the primary and backup tritium source in accordance with the Secretary's announcement (see also the Preface).

05.05 Several commentors ask why the preparation of this EIS should impact the Bellefonte Conversion EIS. One commentor opines that it would make more sense to complete the Conversion EIS so that the people living near the sites can make a decision about what they would like to see in their community. The commentor suggests the CLWR EIS should incorporate the Conversion EIS in its entirety since they are connected actions. The commentor points out that in Section 3.2.6.1, the CLWR Draft EIS states, "Such conversion [of Bellefonte to fossil fuel] would be independent of this EIS and would not occur until after a decision were made regarding the role of Bellefonte 1 and 2 in tritium production." This sentence asserts that the consideration of the conversion to fossil fuel at Bellefonte is independent of the CLWR EIS at the same time that it states explicitly that it is dependent on the outcome of this EIS. The commentor suggests that a comparison be made between Bellefonte as a nuclear plant making tritium and Bellefonte as a fossil fuel plant. Other commentors question why the CLWR Draft EIS did not include an alternative to complete the Bellefonte plant as a fossil fuel electricity plant. One commentor specifically questions the validity of the CLWR EIS because this alternative is not included. This commentor asserts that the EIS needs to compare the eventual decommissioning and decontamination costs of Bellefonte as a nuclear site with the costs of Bellefonte as a fossil-fuel electricity generation plant.

Comments Summarized: 94-11, 503-10, 702-14, 803-9

Response: It is a well-established principle under NEPA that the purpose and need of a proposed action should delineate the limits of the reasonable alternatives to that action. That is, an alternative that does not accomplish the agency's goals is not a reasonable alternative.

As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy the national security requirements directed

by the President. DOE believes that the CLWR EIS discusses all of the reasonable alternatives for producing tritium in one or more CLWRs to satisfy such national security requirements.

Converting the Bellefonte plant to a fossil fuel electricity-generating plant is discussed in the CLWR EIS (see Volume 1, Section 1.5.2.4). As discussed in that section, TVA has completed a Final EIS for the Bellefonte Conversion Project (TVA 1997) that analyzes the reasonably foreseeable environmental impacts associated with converting the Bellefonte plant to a fossil fuel plant. However, with respect to the CLWR EIS, conversion of the Bellefonte plant to a fossil fuel electricity-generating plant would not accomplish DOE's purpose and need as stated in the CLWR EIS. As such, conversion of the Bellefonte plant to a fossil fuel plant is not a reasonable alternative for the CLWR EIS and, thus, is not analyzed in the CLWR EIS.

05.06 The commentor expresses the opinion that the completion of the Bellefonte Nuclear Plant be analyzed in a separate EIS. Unless solely used for tritium production, this EIS should not suffice both for the completion and commercial operation of the Bellefonte Plant.

Comment Summarized: 143-2

Response: TVA is a cooperating agency with DOE on the CLWR EIS. TVA plans to adopt the CLWR EIS and issue a TVA Record of Decision. Upon adoption, the CLWR EIS would effectively update TVA's Bellefonte environmental statement, which was revised in 1993. All remaining construction impacts, as well as all operational impacts that relate to operation as a nuclear power plant, are addressed in this EIS. Additional impacts peculiar to tritium production also are addressed. TVA has worked closely with DOE to ensure that all aspects of completing and operating Bellefonte have been considered. Although DOE's purpose for completing Bellefonte is tritium production, the CLWR EIS also discusses TVA's need for power and concludes that power generation from Bellefonte could be used in lieu of other options analyzed in TVA's *Energy Vision 2020, Integrated Resource Plan and Environmental Impact Statement* (TVA 1995).

05.07 One commentor asserts that DOE has not addressed the full range of expected safety and environmental impacts and, therefore, is deficient with respect to NEPA and implementation of Council on Environmental Quality regulations. The commentor says that the CLWR EIS has not identified and assessed the worldwide environmental impacts that would result from a Federal action to approve the CLWR option. The commentor also opines that, "Adoption of the CLWR option would undermine international nonproliferation objectives and result in a higher probability that some nations will initiate or continue production of materials for nuclear weapons in commercial reactors."

Comments Summarized: 45-5, 503-8

Response: The CLWR EIS has been prepared in accordance with Council on Environmental Quality regulations (40 CFR 1500-1508) and DOE's NEPA regulations (10 CFR 1021) and procedures. To the extent that potential environmental impacts could be identified for the alternatives analyzed, they are included in the CLWR EIS. This analysis includes the direct, indirect, and cumulative environmental consequences of the production of tritium in three operating CLWRs and the completion and operation of two partially completed CLWRs. The proposed action does not have any worldwide impacts. The proposed action is not expected to have any impact upon the nuclear weapons endeavors of other nations; would not violate or impact any international treaties or agreements; would not have any impact on ongoing negotiations to further reduce nuclear weapons stockpiles; and would not promote nuclear proliferation. [See also the response to Comment Summary 01.04 for additional information.]

05.08 The commentor states that in the CLWR Draft EIS, Section 1.4, NEPA Strategy, DOE proposes an action that may prove to be unwise and untenable—that tritium will be produced in one of two ways even if other EISs (i.e., APT and Tritium Extraction Facility) demonstrate the impacts to be drastic or prohibitive. The

commentor says that DOE apparently leaves itself no room to back out of a position that runs counter to the intent of NEPA. The commentor also asks whether the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) stands regardless of the outcome of the EISs which tier [sic] from it.

Comment Summarized: 94-9

Response: On December 22, 1998, Secretary Richardson announced that DOE intends to produce tritium in CLWRs (DOE 1998d). The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. The Secretary's announcement that the CLWR would be the primary tritium supply technology reaffirms the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) to construct and operate a new tritium extraction capability at the Savannah River Site. The CLWR EIS assesses the environmental impact of tritium production at each of the TVA sites and the transportation impacts associated with transferring TPBARs to the Savannah River Site. In accordance with the Secretary's announcement, Volume 1, Section 3.2.7 of the CLWR EIS has been revised to indicate DOE's Preferred Alternative for tritium production. In preparing both the Programmatic EIS and the project-specific EISs (CLWR EIS, APT EIS, Tritium Extraction Facility EIS), no drastic or prohibitive environmental impacts were identified. Moreover, the NEPA regulations do not mandate that an agency select the most environmentally beneficial alternative. See also the Preface to the CLWR EIS for a discussion of DOE's intent to issue a consolidated Record of Decision.

05.09 The commentor notes that opportunities did not exist for the public to participate in the development of the NRC's environmental assessment of the Watts Bar Lead Test Assembly. Another commentor charges that the Lead Test Assembly tests were already underway when the public meeting was held.

Comments Summarized: 94-10, 835-2

Response: The public had several opportunities to state their concerns to the NRC prior to the start of the Lead Test Assembly demonstration in September 1997. On December 23, 1996 (62 FR 67584), the NRC announced it would hold a public hearing for public comment regarding a topical report entitled, "Report on the Evaluation of Tritium-Producing Burnable Absorber Rod Lead Test Assembly." The time and place of the public hearing was announced on January 27, 1997, and the public hearing was held in Washington, D.C., on February 25, 1997.

On July 23, 1997 (62 FR 39557), NRC announced another public hearing in Sweetwater, Tennessee, on August 7, 1997, regarding TVA's proposal to insert lead test assemblies containing TPBARs at the Watts Bar Nuclear Plant. The purpose of the hearing was to provide an opportunity for public comment on the technical issues and to ensure that the public is aware of the NRC staff's review activities and has an opportunity to provide comments on them.

Also, on June 11, 1997 (62 FR 31853), the NRC announced that the "Report on the Evaluation of the Tritium-Producing Burnable Absorber Rod Lead Test Assembly" (NRC 1997) was available from the NRC for public inspection. Any member of the public could request and obtain a copy of the document and provide comments. Finally, on September 11, 1997, the NRC issued its "Environmental Assessment and Finding of No Significant Impact" (62 FR 47835) for the license amendment to allow the insertion of the lead test assemblies into the Watts Bar Nuclear Plant for testing. In addition, as part of the license amendment process for the lead test assembly demonstration, NRC issued a Notice of Opportunity for Hearing (62 FR 30644). No comments were received and the amendment was issued on September 15, 1997 (62 FR 52596). Each of these actions by the NRC involved the public.

05.10 One commentor requests DOE to provide information on the benefits DOE or TVA have obtained from the Watts Bar Lead Test Assembly demonstration. Another commentor suggests that data from the Lead Test

Assembly demonstration should be reviewed and analyzed before the CLWR Final EIS is completed. Commentors question whether it is reasonable to make a tritium technology decision before concluding the Lead Test Assembly demonstration at Watts Bar. Another commentor requests that DOE delay reissuing another Draft EIS until such time as complete tests have been run on the TPBARs currently at Watts Bar. Another commentor asks what will be done with the TPBARs used in the Lead Test Assembly tests at Watts Bar and when will it be done. This commentor also asks how DOE will know that the production process works if tritium is not extracted from the TPBARs used in the Lead Test Assembly tests. Another commentor asks whether there is any incremental release of tritium from the TPBARs being tested in the Lead Test Assembly demonstration. Another commentor asks how many TPBARs were inserted into the Watts Bar reactor.

Comments Summarized: 4-4, 116-4, 128-1, 143-3, 702-6, 704-9, 802-3

Response: As described in Volume 1, Section 1.5.1.2 of the CLWR EIS, DOE and TVA are currently conducting a Lead Test Assembly demonstration to confirm and provide confidence to regulators and the public that tritium production in a CLWR is technically straightforward and safe. This confirmatory demonstration, which involves irradiating 32 TPBARs in Watts Bar Unit 1, began in September 1997. Once irradiation is completed (approximately March 1999), the TPBARs will be removed and undergo post-irradiation examination. The TPBARs will be examined extensively, both in a nondestructive and destructive manner, including some extraction testing. The benefits received to date from the Lead Test Assembly demonstration are: (1) the design and fabrication of the TPBARs were successfully completed to meet all requirements; (2) Watts Bar was successfully licensed by the NRC for the irradiation demonstration; (3) the CLWR program has demonstrated all aspects of the program, from TPBAR design through actual insertion and irradiation in a CLWR; and (4) routine monitoring shows that TPBARs are performing as intended (i.e., tritium effluents in the reactor coolant system are as expected and neutron flux levels in the reactor core are as expected).

The confirmatory tests of the Lead Test Assembly demonstration at Watts Bar are not required prior to the completion of this EIS. DOE has over 10 years of extensive development and testing, including the irradiation of tritium-producing rods at the Advanced Test Reactor at the Idaho National Engineering Laboratory. Examination of these rods proved that the rods make and retain tritium. The Lead Test Assembly demonstration is confirmatory and is not being done for technical reasons, but to provide confidence to the NRC and the public that tritium production in a light water reactor is technically straightforward and safe. Based on over 10 years of experience utilizing this design of TPBARs in the Advanced Test Reactor and extensive post-irradiation examinations conducted at Argonne National Laboratory-West and Pacific Northwest National Laboratory, DOE is confident that placement of up to 3,400 TPBARs in a CLWR would have minimal impact on normal reactor operations and on factors such as TPBAR burnup and reactor physics (see Volume 1, Appendix A of the CLWR EIS).

05.11 The commentor cites the Council on Environmental Quality's regulations and a number of court cases and states that: (1) the EIS is woefully inadequate and incomplete and DOE did not consider a broad-enough range of alternatives; (2) an alternative not considered is the production of tritium for fewer years or in smaller amounts; the commentor requests consideration only of lower rates or fewer years of tritium production, not more; and (3) DOE failed to identify alternatives that were dropped from consideration and explain why they were dropped. The commentor also asks why the Preferred Alternative was not identified.

Comment Summarized: 116-2

Response: (1) It is a well-established principle under NEPA that the purpose and need of a proposed action should delineate the limits of the reasonable alternatives to that action. That is, an alternative that does not accomplish the agency's goals is not a reasonable alternative. As explained in Volume 1, Chapter 3 of the

CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy the national security requirements directed by the President. DOE believes that the CLWR EIS addresses all of the reasonable alternatives for producing tritium to meet national security requirements. Even if it were reasonable to consider the alternatives suggested by the commentor, their impacts would be less than, and subsumed within, those presented in the CLWR EIS. The CLWR EIS also contains a sensitivity analysis that addresses the effects of a reduced production cycle (Volume 1, Section 5.2.9).

(2) The 1996 Nuclear Weapons Stockpile Plan, which represents the latest official guidance for tritium requirements, is based on a START I-level stockpile size of approximately 6,000 accountable weapons. To support such a stockpile, a new tritium supply is required by approximately 2005, not 2010 as the commentor states. As described in Volume 1, Section 3.2.1 of the CLWR EIS, the CLWR program is being designed to produce up to 3 kilograms of tritium per year and has been revised to explain that this amount represents an unclassified maximum requirement, and only would be required if the tritium reserve, which is maintained for emergencies and contingencies, were ever lost or used. To ensure that the EIS assessment of potential environmental impacts is conservative, the EIS presents the environmental impacts of maximum tritium production at each of the five TVA reactor alternatives. In reality, DOE intends to produce only as much tritium as actually required, which would be significantly less than the amount presented in the CLWR EIS (e.g., maximum tritium production at each of five TVA reactors). NEPA does not require an agency to consider alternatives that are infeasible, ineffective, or inconsistent with the basic policy objectives for the action at issue. The case cited by the commentor, *Friends of the Bitterroot, Inc., v. Forest Service 25 E.L.R 21186 (D.Mt. 1994),* is not inconsistent with this principle. The court noted (in the excerpt quoted by the commentor) that the additional alternative required to be considered (preservation of a roadless area) was within the discretion of the agency.

In the present action, DOE does not have discretion to consider the underlying basis of the Presidential Decision Directive, let alone to consider changes to the tritium production levels and schedules which the President mandates. The requested alternative to consider such changes is, therefore, not within the "reasonable alternatives" which NEPA requires to be considered (40 CFR 1502.14).

(3) Volume 1, Section 3.2.2 of the CLWR EIS identifies the alternatives that were dropped from consideration, (specifically other CLWRs considered for tritium production) and the rationale for their elimination. Programmatic alternatives for the production of tritium were discussed in the Final Programmatic EIS (DOE 1995).

(4) In Section 3.2.7 of the CLWR Draft EIS, DOE stated that a Preferred Alternative was not known at the time of the publication. The Preferred Alternative for the CLWR EIS was announced by Secretary Richardson on December 22, 1998, and is identified in Volume 1, Section 3.2.7 of the CLWR Final EIS. Question 4b. of "40 Most Asked Questions" concerning the Council on Environmental Quality's NEPA regulations addresses the issue of whether the Preferred Alternative has to be identified in the CLWR Draft EIS. The Council's response is as follows: "Section 1502.14(e) requires the section of the EIS on alternatives to identify the agency's Preferred Alternative if one or more exists, in the draft statement, and identify such alternative in the final statement . . . ." This means that if the agency has a Preferred Alternative at the Draft EIS stage, that alternative must be labeled or identified as such in the Draft EIS. If the responsible Federal official in fact has no Preferred Alternative at the Draft EIS stage, a Preferred Alternative need not be identified there. By the time the Final EIS is filed, Section 1502.14(e) presumes the existence of a Preferred Alternative and requires its identification in the Final EIS ". . . unless another law prohibits the expression of such a preference."

05.12 The commentor is concerned that DOE is vague and noncommittal in its discussion of impacts to the environment.

Comment Summarized: 116-6

Response: DOE believes that it has adequately addressed impacts to the environment that could result from implementing the various alternatives. Volume 1, Chapter 5 of the CLWR EIS addresses specific site and regional impacts to 12 resource areas from the proposed alternatives, and Appendices C, D, E, and G provide further detailed analysis related to human health effects from normal operation, human health effects from facility accidents, human health effects of overland transportation, and environmental justice, respectively.

05.13 The commentor asserts that, since the operation of Bellefonte represents the most significant impacts of any of the alternatives, it should not be a viable alternative.

Comment Summarized: 116-15

Response: NEPA requires the preparation of an EIS for major Federal actions that may significantly affect the quality of the environment. The analysis for the CLWR EIS was conducted in accordance with Council on Environmental Quality regulations (40 CFR 1500-1508) and DOE's NEPA regulations (10 CFR 1021) and procedures. These regulations do not mandate that an agency select the most environmentally beneficial alternative. The purpose of the NEPA process is to ensure that accurate environmental studies are performed; that they are done with public involvement; and that public officials, like those at DOE, make decisions based on an understanding of the environmental consequences.

As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy the national security requirements directed by the President. DOE believes that the CLWR EIS addresses all of the reasonable alternatives for producing tritium to meet national security requirements.

05.14 The commentor states that: (1) DOE has not properly addressed the cumulative impacts in the CLWR EIS. The commentor asserts that (2) Section 5.3.2 of the CLWR EIS addresses only indirect impacts and not cumulative impacts as defined by the Council on Environmental Quality regulations. The commentor suggests that the EIS should address the combined effects of the proposed action; for example, minor noise impacts on wildlife and small impacts to aquatic life could be combined to result in significant impacts on the ecosystem. The commentor also asserts that there is a very limited discussion of other projects in the area. The commentor also asks, (3) where is the cumulative analysis on Bellefonte's impact in conjunction with the Widow's Creek Fossil Plant? The commentor also refers to (4) an increase in the diversion of water from the Tennessee River for public use.

Comment Summarized: 116-16

Response: (1) DOE feels that Volume 1, Section 5.3 of the CLWR EIS adequately addresses cumulative impacts. Council on Environmental Quality/NEPA regulations define "cumulative impacts" as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

(2) In Volume 1, Section 5.3.2, the CLWR EIS states that for Watts Bar and Sequoyah there are no known Federal or nonfederal facilities that could contribute to a change in the radiological environment of the region of influence. In addition, the CLWR Final EIS Tables 5-59 and 5-60 address land use, air quality, and groundwater requirements at the Watts Bar and Sequoyah Nuclear Plants.

For the Bellefonte plant, DOE acknowledges that there will be future growth in Jackson County, and this is indicated in Volume 1, Chapter 5, Table 5-61. The cumulative impacts from tritium production at the Bellefonte Nuclear Plant are presented in Table 5-62.

No causal relationships were found between resource consumption, effluent emissions, and health of surrounding ecosystems.

(3) The contributory effect of the Widow's Creek Fossil Plant is accounted for in the ambient air and water quality and background radiological conditions described for the region around Bellefonte in Volume 1, Chapter 4 of the CLWR EIS. These conditions have been combined with the incremental impacts associated with the completion and operation of Bellefonte for tritium production and have been presented for each resource area in Chapter 5 of the EIS.

(4) DOE and TVA are aware of increases in water diversions from the Tennessee River for public use and have considered both demand and discharge impacts in the CLWR EIS analysis on water quality.

05.15 The commentor provides various citations to regulations relating to "significance" of environmental impacts and requests that the CLWR EIS adequately identify how the proposed project will impact the environment as "a whole." The commentor also asserts that the EIS glosses over environmental issues and dismisses the significant impacts the project will have on the "surrounding ecosystem, humans and all." The commentor criticizes DOE for concluding that the operation at Bellefonte would have no significant adverse impacts.

Comment Summarized: 116-18

Response: NEPA requires the preparation of an EIS for major Federal actions that may significantly affect the quality of the environment. The analysis for the CLWR EIS is conducted in accordance with Council on Environmental Quality regulations (40 CFR 1500-1508) and DOE's NEPA regulations (10 CFR 1021) and procedures. The purpose of the NEPA process is to ensure that accurate environmental studies are performed; that they are done with public involvement; and that public officials, like those at DOE, make decisions based on an understanding of the environmental consequences.

Volume 1, Chapter 5 of the CLWR EIS provides a detailed description of impacts associated with land resources, noise, air quality, water resources, geology and soils, ecological resources, archaeological and historic resources, socioeconomic aspects, public and occupational health and safety, and waste management. Chapter 3 summarizes the impacts. In addition, the CLWR EIS has three Appendices (C, D, and E) that discuss in detail the health impacts associated with each of the alternatives. The EIS addresses all of the elements of significance required by Council on Environmental Quality regulations and case law associated with NEPA.

DOE believes that the environmental impacts at Bellefonte have been adequately addressed in the CLWR EIS.

05.16 Two commentors find the EIS to be deficient and inadequate as a NEPA document. One commentor feels that DOE sloughs off the difficult issues raised by tritium production at Bellefonte and that its use of classified information does not satisfy the open process of NEPA. The other commentor states that the EIS is substantially deficient as a NEPA document in its analysis of the environmental impacts, in addition to not discussing all reasonable alternatives.

Comments Summarized: 116-24, 137-3

Response: DOE believes that the EIS is adequate and fully complies with NEPA with respect to the analysis of impacts at the proposed sites. The EIS evaluates all reasonably foreseeable impacts for all reasonable alternatives.

With respect to addressing all reasonable alternatives, it is a well-established principle under NEPA that the purpose and need of a proposed action delineate the limits of the reasonable alternatives to that action. That

is, an alternative that does not accomplish the agency's goals is not a reasonable alternative. As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. DOE believes that the CLWR EIS addresses all of the reasonable alternatives for producing tritium to meet national security requirements. A discussion of the development of alternatives is given in Section 3.2.

With respect to the use of classified information, tritium requirements are classified to protect national security. While DOE's philosophy is to disclose as much information to the public as possible, this does not include classified information. Chapter 2 of the CLWR EIS provides unclassified information regarding tritium requirements. As discussed in that chapter, the President has directed DOE to provide a new tritium supply source by approximately 2005 in order to meet the requirements set forth in the most recent Nuclear Weapons Stockpile Plan. The unclassified tritium requirement information presented in Chapter 2 is consistent with the classified tritium requirements.

05.17 The commentor suggests that DOE should not use five- and six-year old documentation for the CLWR EIS.

Comment Summarized: 703-9

Response: The CLWR EIS was prepared using the most current information available. In addition to existing EISs, those persons preparing the document reviewed all recent available documents and consulted with TVA personnel to obtain accurate and timely information (TVA 1998a). Further, prior to publication of the Draft EIS and the Final EIS, it underwent internal review within TVA to ensure that the latest information was used in its preparation (TVA 1998c, TVA 1999).

05.18 The commentor believes the EIS process is very one-sided and thinks DOE and other Federal agencies may need to review it.

Comment Summarized: 704-1

Response: DOE has made every effort to ensure that the preparation of this EIS has not been one-sided. DOE has encouraged public participation in the process beginning with the initial scoping meetings and continues it with incorporation of public comments in the CLWR Final EIS. Further, DOE has consulted with a number of other Federal and state agencies during its preparation of the CLWR EIS. In addition, the EIS has been reviewed by other state and Federal agencies. The NEPA process is established through Council on Environmental Quality regulations (40 CFR 1500-1508). In addition, DOE has developed its own implementing regulations for NEPA (10 CFR 1021). This EIS was prepared in accordance with both sets of regulations, as well as NEPA itself (42 U.S.C. 4321 *et seq.*).

05.19 The commentor would like to see DOE's presentation of the EIS information to the public accompanied by a presentation from an independent reviewer.

Comment Summarized: 704-2

Response: In addition to its own review of the CLWR EIS, DOE has provided copies to numerous Federal and state agencies, including the EPA, for review and comment. The EPA has an obligation under Section 309 of the Clean Air Act to review and comment in writing on the environmental impact of any matter relating to the authority of the Administrator. In addition, the public comment period provides opportunity for all interested parties to provide their own independent review of the document. DOE welcomes these independent reviews and feels that they lead to both a better document and, ultimately, a better decision.

05.20 Two commentors commend DOE and TVA for the thoroughness and depth of the CLWR Draft EIS. One commentor states that all the potential impacts have been identified and thoroughly evaluated. Another commentor thinks the CLWR Draft EIS does an excellent job covering the options and statistics.

Comments Summarized: 713-1, 719-4

Response: DOE acknowledges the commentors' recognition of the quality of the CLWR Draft EIS.

05.21 The commentor asks why the Government is not listening to the people. Another commentor asks by what means can citizens prevent the making of tritium.

Comments Summarized: 2-5, 222-2, 817-1

Response: The CLWR program has undertaken an aggressive public outreach program and has made an effort to listen to all members of the public who have views on what the U.S. Government should do with respect to tritium production alternatives. DOE has reviewed and responded to all comments received during the public comment period.

DOE's role in the production of tritium and all nuclear materials required for the defense of the United States is mandated by Congress through its enactment of the Atomic Energy Act of 1954, and the President in the Nuclear Weapons Stockpile Plan. Further, any decision to produce tritium at a CLWR would have to be funded by Congress. Thus, those citizens wishing to prevent the making of tritium should express their views by writing to their congressional representatives and the President.

05.22 The commentor asks for a copy of the *Final Environmental Impact Statement for the Bellefonte Conversion Project* and a copy of the Record of Decision associated with this EIS.

Comment Summarized: 4-1

Response: TVA provided the commentor a copy of the *Final Environmental Impact Statement for the Bellefonte Conversion Project*. The Record of Decision for this EIS will not be issued until the outcome of the current TVA effort with DOE to produce tritium at Bellefonte is completed.

05.23 The commentor asks DOE not to intimidate or dismiss the public and to give the public adequate information to evaluate DOE's actions.

Comment Summarized: 702-1

Response: The NEPA process is one of the most successful and effective ways that DOE has to both inform and receive input from the public. Every effort is made to prepare an EIS that is complete and understandable. Further, supporting documentation is referenced and all referenced material is made available to the public in reading rooms. It is not DOE's intention to intimidate or dismiss the public at any stage in the NEPA process. All public comments received during the public comment period will be reviewed and responded to before DOE decides on a course of action.

05.24 The commentor would like DOE to hold an additional hearing on tritium production in Nashville, Tennessee.

Comment Summarized: 707-9

Response: Prior to the beginning of the public comment period, DOE evaluated potential locations for public hearings. An effort was made to ensure that all geographic areas were represented. Thus, it was decided to hold hearings in North Augusta, South Carolina; Rainsville, Alabama; and Evensville, Tennessee. These hearings were held on October 1, 6, and 8, 1998, respectively, and were well attended. DOE believes that the geographic distribution of these hearings was adequate to provide an opportunity for those residents in closest proximity to the TVA reactors being considered and the site of the new extraction capability to attend.

05.25 The commentor questions the definition of "previous impact statements" that "serve to a great extent as the basis for this EIS." The span of time for these documents ranges from three years to fifteen years or more, and the commentor questions how DOE selected its data.

Comment Summarized: 86-4

Response: Section 1.5.1.3 summarizes the relationship between the CLWR EIS and other relevant NEPA documents, including EISs for the operation of the Watts Bar and Sequoyah Nuclear Plants and the construction of the Bellefonte Nuclear Plant. The documents have been completed and serve as a baseline on which the environmental impacts associated with tritium production can be assessed. The information has been updated through communications with TVA staff, along with current TVA documents. DOE used the most current sources of information available in compiling data to assess the impacts of tritium production. Volume 1, Chapter 7 and each of the appendices in the CLWR EIS provide a detailed list of the references that were the basis of this analysis.

05.26 The commentor is concerned that DOE will focus too heavily on the potential economic benefits from the Bellefonte site and will not weigh these benefits against decreases in land resources, air quality, water quality, ecosystem quality, and quality of life issues. Another commentor expresses concern that politics would influence the decision.

Comments Summarized: 116-23, 231-2, 812-1

Response: DOE has undertaken the preparation of the CLWR EIS to evaluate the environmental impacts of producing tritium at a CLWR at Bellefonte, as well as Watts Bar and Sequoyah. DOE will fairly and completely consider environmental issues, along with other pertinent issues such as economic, policy, and statutory requirements, when arriving at a decision. The decision will be made after the CLWR Final EIS has been published. Council on Environmental Quality Regulation 1505.2, Record of Decision, states that each agency shall prepare a concise public record of decision.

The Record of Decision must identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives considered to be environmentally preferable. An agency may discuss preferences among alternatives based on relevant factors, including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors, including any essential considerations of national policy balanced by the agency in making its decision and how those considerations entered into its decision.

The Record of Decision must state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted and, if not, why. A monitoring and enforcement program is to be adopted and summarized where applicable for any mitigation.

This EIS has been undertaken to evaluate the environmental impacts of tritium production in a CLWR. The decision resulting from the NEPA process will be announced in a Record of Decision following publication of the Final EIS. That decision will be based on the evaluation of impacts presented in the EIS, as well as other pertinent factors such as economic considerations.

05.27 One commentor asks whether DOE is considering purchasing a TVA reactor or its irradiation services. The commentor refers to the December 1995 Record of Decision, which contains the option of DOE purchasing a reactor. The commentor expresses concern that external, peer, regulatory, and fiscal reviews of operations at the tritium-producing nuclear plants would disappear because DOE nuclear defense facilities are not licensed by the NRC, nor is DOE obligated to adhere to the Institute of Nuclear Power Operations' industrial standards of excellence. However, the commentor believes the tax payers and rate payers should realize a return on the $4.5 billion already spent on Bellefonte. The commentor recommends that, if Bellefonte comes on line, it must never be allowed to become a government-owned, contractor-operated defense facility that will go unchecked by the mechanisms designed to ensure it is managed with the safety of the citizens and the environment as its primary concern. Another commentor asks if oversight by state and Occupational Safety and Health Administration regulators would continue if TVA partners with DOE to produce tritium.

Comments Summarized: 58-3, 506-2, 610-2, 802-1, 804-1

Response: The 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) considered the possibility of purchasing a reactor before the Request for Proposals process began. As events unfolded, the purchase option became irrelevant because only TVA nuclear plants were proposed for tritium production. As stated in Volume 1, Section 1.1.1, DOE considered only the purchase of irradiation services, not the purchase of a reactor. As TVA is a U.S. Government agency, the Watts Bar, Sequoyah, and Bellefonte Nuclear Plants are already government-owned. If chosen for tritium production, the Bellefonte plant will be completed as a nuclear power plant and would continue to be regulated by the NRC. Therefore, use of the TPBARs in one of Bellefonte's reactors would be governed by NRC regulations, and NRC approval would be required before the use of the TPBARs could begin. After this approval, the Bellefonte plant would be subject to periodic NRC safety inspections and evaluations throughout its planned lifetime (40 years).

The TVA plants would continue to comply with all applicable Federal and state regulations. Regulatory oversight will not be affected by tritium production in a CLWR.

05.28 The commentor requests clarification on how DOE and NRC define the word "significance."

Comment Summarized: 86-5

Response: Although the word significant is used in the CLWR EIS, there is not one meaning of this term (see 40 CFR 1508.27). When possible, the EIS defines what is meant by "significant." For example, in Volume 1, Section 5.2.3.2, the EIS defines significant as noise impacts greater than 65 decibels A-weighted [dBA]. In Section 3.2.6.2, the transportation risks for Bellefonte 1 or 2 would be significantly lower than one fatality per year, which is then defined as less than one fatality per 100,000 years. Therefore, it is important to look at the word "significant" in the context of its usage.

The commentor may be referring to Section 1.5.1.2, DOE's Lead Test Assembly Environmental Assessment, and the TPBAR confirmatory demonstration at Watts Bar 1. The NRC prepared a separate environmental assessment and issued its own Finding of No Significant Impact for the Environmental Assessments. According to Council on Environmental Quality NEPA regulations, a Finding of No Significant Impact is a document which briefly explains the reasons why a proposed action addressed in an environmental assessment will not have a significant effect on the human environment and, therefore, why an EIS will not be necessary (40 CFR 1508.13).

The NRC Finding of No Significant Impact (62 FR 47835) indicates that they evaluated the impacts relative to the requirements set forth in 10 CFR Part 51. Specifically, they evaluated the possibility of accidents, changes in types or amounts of effluents, offsite population doses, and worker doses attributable to the demonstration. For example, they found that if the entire amount of tritium was released in a year's discharge

of cooling water, the maximum annual dose to a member of the public would be less than 1 percent of the NRC criterion for effluents and only about 0.007 percent of the average annual dose resulting from naturally occurring radionuclides. Based on its environmental assessment, the NRC staff concluded that there are no significant radiological or nonradiological impacts associated with the proposed action and that the proposed license amendment will not have a significant effect on the quality of the human environment. The commentor is referred to the NRC document (62 FR 47835) for further details on this decision.

05.29 One commentor questions whether the tritium technology decision will be made prior to completing the CLWR EIS and the APT EIS. The commentor opines that DOE should use the comments received on these EISs in the decisionmaking process. Another commentor questions whether a technology decision prior to completion of the project-specific EISs (i.e., the APT EIS and the CLWR EIS) would be premature. Another commentor asks whether the Secretary would make a decision before the final tritium production EISs (CLWR and APT) are completed. Another commentor suggests that the Final APT, Tritium Extraction Facility, and CLWR EISs not be prepared or should be combined. Another commentor asks why input from area residents was not included in the decision criteria shown in DOE's December 14, 1998, presentation.

Comments Summarized: 44-4, 501-6, 808-1, 809-3

Response: On December 22, 1998, the Secretary announced that DOE intends to produce tritium in CLWRs (DOE 1998d). The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. The Secretary's announcement that the CLWR would be the primary tritium supply technology reaffirms the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) to construct and operate a new tritium extraction capability at the Savannah River Site. That announcement was made based on all available information, the Final Programmatic EIS, and any comments that were received related to the CLWR EIS and the APT EIS. DOE intends to complete these EISs to support proposed project-specific actions that could be implemented by the Secretary's announcement. The express intent of the December 14, 1998, public meeting was to solicit input from area residents prior to the Secretary's announcement on December 22, 1998. See also the Preface to the CLWR EIS for a discussion of DOE's intent to issue a consolidated Record of Decision.

05.30 The commentor, observing that the analysis of DOE's most likely scenario (2,000 TPBARs) is not in the CLWR Draft EIS, expresses frustration that the public can't comment on a scenario unless it is presented in the EIS.

Comment Summarized: 702-2

Response: The EIS presents the environmental impacts associated with the maximum loading of TPBARs in a reactor (3,400 TPBARs) and also addresses lesser amounts.

05.31 Several commentors stated that notification of the December 14, 1998, meeting was too short. Other commentors stated that the December meeting was scheduled at a bad time—during the holidays. Yet other commentors stated that the mailing of the notification for the December meeting was too late; did not reach all interested parties; and did not provide sufficient time to prepare for such an important meeting.

Comments Summarized: 202-2, 207-1, 212-1, 247-1, 800-4, 802-4, 803-5, 809-2, 835-1

Response: Prior to fulfilling his requirement to reach a technology decision by the end of 1998, the Secretary of Energy asked TVA to resubmit a proposal for the Watts Bar and Sequoyah reactors, as well as final proposals for completion of TVA's Bellefonte reactor in order to provide DOE with a comprehensive set of options. Such proposals were provided to DOE the first week of December 1998. In order for the public to have an opportunity to provide DOE with input on these proposals prior to the Secretary's decision at the end of 1998, it was necessary to hold the December 14, 1998, meeting with a minimum of notice to the public. To maximize public participation on such short notice, DOE sent more than a thousand individual notices of the meeting to interested parties on December 10, 1998; advertised notice of the meeting in local newspapers; and provided the local media with a December 8, 1998, press release giving notice of the time and place of the meeting.

DOE recognizes that the December 14, 1998, meeting was scheduled, announced, and conducted in a relatively short time frame. As stated in the introductory comments by Mr. Barry Lawson, the public meeting facilitator, this December 14, 1998, meeting was not for the purpose of discussing the EIS, but to provide DOE with public input on the resubmitted TVA proposal to utilize the Watts Bar and Sequoyah plants for tritium production.

In compliance with NEPA requirements, DOE held scoping meetings related to the CLWR EIS proposal in February 1998, and subsequently held public hearings in October 1998 to receive comments on the CLWR Draft EIS. The option of utilizing the Watts Bar and Sequoyah reactors was included in the CLWR Draft EIS. As such, the public was notified of this option through the normal NEPA process and was provided ample time to review and comment on the proposal to utilize the Watts Bar and Sequoyah plants for tritium production.

Participants at the December 14, 1998, meeting were encouraged to provide comments to DOE on the latest TVA proposal. Although these comments are not part of the formal comment process for the CLWR Draft EIS, they are included in the CLWR Final EIS.

05.32 A commentor wants to know if the Secretary of Energy could change his decision after the EISs are published, and states his opinion that the technology decision should not come before the NEPA process and before the safety issues are identified and addressed in the CLWR Final EIS.

Comment Summarized: 808-2

Response: The announcement made by Secretary Richardson on December 22, 1998 (DOE 1998d), which designated the CLWR as the primary tritium production technology, fulfilled DOE's 1995 commitment to select between a CLWR and a linear accelerator. The CLWR option was designated because it is a proven technology; it is the best deal for the taxpayer; and it has the flexibility to meet a range of future needs. DOE will complete key research and development milestones for the accelerator as a backup option, but will not initiate construction. Such a dual track strategy would allow the Secretary of Energy to change his decision at a later date should the CLWRs prove unable to supply the nation's future need for tritium.

05.33 A commentor feels that DOE and TVA have already struck a deal to produce tritium regardless of the concerns of community members.

Comment Summarized: 208-4

Response: As described in Volume 1, Section 1.1.1, the CLWR EIS evaluates the environmental impacts associated with tritium production for all TVA reactor plants offered by TVA during the open procurement process. That procurement process is ongoing, and negotiations are continuing between DOE and TVA. As discussed in Section 1.1.4, because both TVA and DOE are Federal agencies, an agreement between them could be reached through either a contract (per the full and open Federal procurement process) or through an interagency agreement via the Economy Act. The Economy Act is a Federal law that allows two government agencies to enter into an interagency agreement similar to the contractual agreement that a Federal agency would enter into with a nonfederal party through the competitive procurement process.

During preparation of the CLWR EIS the community had several opportunities to provide input through the NEPA process. This participation occurred during the scoping and public comment periods for the CLWR Draft EIS. The public's input is reflected in the CLWR Final EIS.

CATEGORY 06: REASONABLE ALTERNATIVES SELECTION

06.01 The commentor disagrees with DOE's assertion that tritium must be produced. The commentor asserts that this provides "no options; no alternatives." The commentor further states that, "the purpose of an EIS is to present all possible, viable alternatives. Instead, the documents provided interested parties contain nothing more than bureaucratic filler for foregone conclusions. The fact that you provide a chart with 18 reactor combinations does not give the vulnerable public the 'alternatives' required by NEPA; nor does the consideration of producing tritium in an accelerator provide an alternative."

Comment Summarized: 116-1

Response: As described in Volume 1, Section 1.1.3 of the CLWR EIS, the CLWR EIS tiers from the Final Programmatic EIS (DOE 1995) and Record of Decision (60 FR 63878). As such, the CLWR EIS evaluates the reasonable alternatives for tritium production in one or more CLWRs to satisfy national security requirements as directed by the President. These national security requirements, which are set forth in Section 91 of the Atomic Energy Act, are not discretionary. The specific CLWRs that are assessed in the CLWR EIS were determined through a competitive procurement process described in Volume 1, Section 1.1.4 of the CLWR EIS. It is a well established principle under NEPA that the purpose and need of a proposed action should delineate the limits of the reasonable alternatives to that action. That is, an alternative which does not accomplish the agency's goals is not a reasonable alternative. As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. DOE believes that the CLWR EIS discusses all of the reasonable alternatives for producing tritium in one or more CLWRs to satisfy these national security requirements. The commentor does not identify any other reasonable alternatives, nor does the commentor provide any reasons why the alternatives evaluated are not reasonable. With respect to the commentor's implication that the EIS should evaluate an alternative that would not produce tritium (e.g., "a real no action alternative"), the response to Comment Summary 05.02 discusses this issue.

06.02 The commentor asserts that DOE will not reach 1996 Nuclear Weapons Stockpile Memorandum stockpile levels (tritium requirements) until 2010 and that DOE should evaluate the alternative of a delayed startup. The commentor further asserts that, "all of the DOE alternatives result in the same amount of tritium in the same amount of time." The commentor opines that this is not legally sufficient and that DOE should evaluate alternative production scenarios.

Comment Summarized: 116-8

Response: The 1996 Nuclear Weapons Stockpile Plan, which represents the latest official guidance for tritium requirements, is based on a START I-level stockpile size of approximately 6,000 accountable weapons. To support such a stockpile, a new tritium supply is required by approximately 2005, not 2010 as the commentor states. As described in Volume 1, Section 3.2.1 of the CLWR EIS, the CLWR program is being designed to produce up to 3 kilograms of tritium per year. Section 3.2.1 has been revised in the CLWR EIS to explain that 3 kilograms of tritium represents an unclassified maximum requirement, and would only be required if the tritium reserve, which is maintained for emergencies and contingencies, were ever lost or used. To ensure that the EIS assessment of potential environmental impacts is conservative, the CLWR EIS presents the environmental impacts of the maximum tritium production at each of the five TVA reactor alternatives. In reality, DOE intends to produce only as much tritium as actually required, which will be significantly less than what is presented in the EIS (e.g., maximum tritium production at each of five TVA reactors). [See the response to Comment Summary 03.03 for more detail on tritium requirements.]

06.03 Several commentors ask questions regarding the fact that TVA has allowed one of its two procurement proposals (the irradiation services proposal) to expire. The commentors question whether this affects the alternatives in the CLWR EIS, and whether there are really alternatives for tritium production at TVA reactors other than Bellefonte Unit 1. One commentor specifically requests that DOE explicitly state the criteria used to define reasonable alternatives and also questions why the Fast Flux Test Facility Reactor and any number of commercial reactors operated by public utilities were not included as reasonable alternatives. One commentor expresses their opposition to using a Hanford reactor (the Fast Flux Test Facility) for the production of tritium.

Comments Summarized: 26-1, 44-6, 94-4, 242-1, 501-7, 502-1, 506-1, 700-1, 706-1, 801-1, 815-2, 832-1

Response: As described in Volume 1, Section 1.1.1, the CLWR EIS evaluates the environmental impacts associated with tritium production for all TVA reactor plants offered during the procurement process. That procurement process is ongoing, and negotiations are continuing between DOE and TVA. Because both TVA and DOE are Federal agencies, an agreement could be reached through an interagency agreement via the Economy Act. The Economy Act is a Federal law that allows two government agencies to enter into an interagency agreement similar to the contractual agreement that a Federal agency would enter into with a nonfederal party through the competitive procurement process. The Federal procurement process for the CLWR program explicitly allows for an interagency agreement via the Economy Act. As such, TVA's action to allow the irradiation services proposal (made in response to the procurement request) to expire, has no bearing on the negotiations that might result in an interagency agreement via the Economy Act. Consequently, all of the TVA reactors that were initially identified during the procurement process as reasonable alternatives for tritium production remain reasonable alternatives. In December 1998, TVA resubmitted a radiation services proposal for the Watts Bar and Sequoyah reactors. Volume 1, Section 1.1.4 of the CLWR EIS was revised to clarify the procurement process.

In response to the commentor who requests the criteria used to define reasonable alternatives, Volume 1, Section 3.2.2 of the CLWR EIS describes the process that DOE employed to receive proposals from owners/operators of CLWRs for tritium production. As explained in that section, DOE issued a request for proposals for the CLWR production of tritium (while the specific requirements are too voluminous for inclusion, the request for proposals is available by contacting the DOE CLWR Program Office). As stated in Volume 1, Section 1.1.4 of the CLWR EIS, the only proposals determined to be responsive to the requirements of the procurement request were from TVA. Through the procurement process, the five TVA reactors evaluated in the CLWR EIS were identified. No other commercial CLWRs were offered by owner/operators and, consequently, the CLWR EIS does not evaluate them. With respect to the Fast Flux Test Facility Reactor, that research reactor is a DOE reactor, not a CLWR. The option of using DOE's existing reactors (such as the

Fast Flux Test Facility at Hanford and the K-reactor at the Savannah River Site) was evaluated but dismissed from further consideration for the reasons stated in Section 3.1.3 of the Final Programmatic EIS (DOE 1995). DOE announced in the December 1995 Record of Decision (60 FR 63878) that it would evaluate whether the Fast Flux Test Facility Reactor might play a role in tritium production. The Secretary of Energy, on December 22, 1998, announced that the Fast Flux Test Reactor would play no role in tritium production (DOE 1998d).

06.04 One commentor asks whether the CLWR Final EIS will include information about the contractual agreements between TVA and DOE and the potential impacts of TVA's contract obligations. Another commentor asks when DOE plans to exercise its option to purchase irradiation services.

Comments Summarized: 700-19, 704-11

Response: Contractual agreements are not a part of the EIS and involve sensitive negotiations that are ongoing and have not been finalized. For these reasons, any contractual agreements made between TVA and DOE regarding production of tritium are not presented in the CLWR EIS. TVA would produce tritium for DOE only if and when necessary.

06.05 One commentor asks if DOE's preferred choice for tritium production would involve several different sites. The commentor believes it might simplify the process if all the necessary activities were performed at one site. Another commentor asks when DOE would use two or more facilities to avoid exceeding the Bellefonte plant's spent fuel generation limit. The commentor believes that analyses that will determine DOE's choice to use one or more reactors for tritium production should be made public because of the implications for TVA ratepayers and U.S. taxpayers. Another commentor asks if the 1995 Record of Decision can be deleted or amended to remove language that would allow DOE to purchase the Bellefonte plant and convert it to a defense facility. Another commentor recommends that DOE identify the Bellefonte facility (backed up by Watts Bar as needed) as its Preferred Alternative in the CLWR Final EIS.

Comments Summarized: 58-7, 90-5, 610-3, 700-8, 707-1, 713-6

Response: On December 22, 1998, Secretary of Energy Bill Richardson announced that DOE now intends to produce tritium in CLWRs (DOE 1998d). The APT would not be constructed at the Savannah River Site, but would be a backup option to CLWRs. The Secretary's announcement that the CLWR would be the primary tritium supply technology reaffirms the 1995 Record of Decision for the Final Programmatic EIS (60 FR 63878) to construct and operate a new tritium extraction capability at the Savannah River Site. The CLWR EIS assesses the environmental impact of tritium production at each of the TVA sites and the transportation impacts associated with transferring TPBARs to the Savannah River Site. In accordance with the Secretary's announcement, Volume 1, Section 3.2.7 of the CLWR EIS has been revised to indicate DOE's Preferred Alternative of using Watts Bar and Sequoyah for tritium production. As stated in Volume 1, Section 1.1.1 of the CLWR EIS, DOE is considering only the purchase of irradiation services, not the purchase of a reactor.

06.06 Several commentors do not understand Table 3-2 in the Draft EIS. One commentor specifically requests that the actual environmental impacts for the various alternatives be displayed in Table 3-2, rather than "dots."

Comments Summarized: 44-5, 700-9

Response: As described in Volume 1, Section 3.2.3 of the CLWR EIS, Table 3-2 presents the various reactor alternative combinations that constitute the reasonable alternatives evaluated in the CLWR EIS. The "dots" in that table depict the combination alternatives. As stated in this section, "the impacts for each of the

18 irradiation alternatives would be the sum of each of the impacts at each of the sites involved." The impacts at each of the sites involved are described in detail in Volume 1, Chapter 5 of the CLWR EIS.

06.07 The commentor requests a comparison between the completed and uncompleted reactors. The commentor asserts that, "the purpose of NEPA is to compel the Government to choose from among reasonable alternatives that which has the least adverse impact on the environment."

Comment Summarized: 94-15

Response: In Volume 1, Chapter 3 of the CLWR EIS, Table 3-13 provides the comparison between the completed and uncompleted reactors.

NEPA requires the preparation of an EIS for major Federal actions that may significantly affect the quality of the environment. The analysis for the CLWR EIS was conducted in accordance with Council on Environmental Quality regulations (40 CFR 1500-1508) and DOE's NEPA regulations (10 CFR 1021) and procedures. These regulations do not mandate that an agency select the most environmentally beneficial alternative. The purpose of the NEPA process is to ensure that accurate environmental studies are performed; that they are done with public involvement; and that public officials, like those at DOE, make decisions based on an understanding of the environmental consequences.

CATEGORY 07: GENERAL SUPPORT/OPPOSITION

07.01 Several commentors express support for the CLWR option and cite several advantages of the CLWR over accelerator production of tritium.

Comments Summarized: 8-1, 59-1, 73-1, 81-1, 88-1, 90-4, 225-3, 233-3, 242-2, 604-3, 624-1, 628-2, 713-5, 832-2

Response: DOE acknowledges that there is both support and opposition for the CLWR program, which is the programmatic No Action Alternative to the APT program. The purpose of the CLWR EIS is to evaluate the environmental impacts of the reasonable CLWR alternatives for providing the tritium necessary to support the enduring stockpile, as defined by the President in the Nuclear Weapons Stockpile Plan. For completeness, Volume 1, Section 5.2.11 and Table 3-14 of the CLWR EIS summarizes the environmental impacts associated with accelerator tritium production at the Savannah River Site.

07.02 Several commentors express their support for the CLWR program in general, citing reasons of national defense, cost-effectiveness, and low environmental impacts, as described in the CLWR EIS. Several other commentors also express their opposition to the CLWR program in general, citing the policy of separation between military and civilian programs, public health and safety, effects to the environment, and cost.

Comments Summarized: 23-3, 28-1, 91-1, 92-1, 93-1, 109-1, 120-1, 121-1, 123-1, 130-1, 202-1, 222-1, 225-1, 227-1, 239-1, 248-2, 250-1, 704-15

Response: DOE acknowledges that there is both support for and opposition to the CLWR program in general. The reasons cited by supporters and opponents have been the subject of specific comments and responses elsewhere in this document. The need for tritium and national defense are discussed in Volume 1, Chapter 2 of the CLWR EIS and in the response to Comment Summary 02.01. Cost is discussed in the response to Comment Summary 23.16. The issue of separation between military and civilian programs is discussed in the

response to Comment Summary 01.09. Public health and safety is discussed in Volume 1, Chapter 5 of the CLWR EIS and in response to Comment Summaries 14.04 and 15.03.

07.03 Several commentors express their support for the Bellefonte option, citing numerous reasons including safety; cost-effectiveness; boost to the regional economy; electricity as a byproduct; TVA's good track record; jobs; use of an existing resource; national defense; proven technology; small environmental impacts; compatibility with the program needs; the right thing to do; a win-win situation; and it is good for the nation, DOE, TVA, and Jackson County.

Several other commentors express their opposition to the Bellefonte option, citing numerous reasons including the dangers of radioactivity, public health and safety, significant impacts to the environment, the policy of separation between military and civilian programs, and nonproliferation.

Comments Summarized: 10-1, 12-1, 15-1, 17-1, 23-1, 24-1, 26-3, 33-1, 34-1, 35-1, 38-1, 42-1, 47-2, 54-1, 55-1, 56-1, 57-1, 58-1, 60-1, 61-1, 62-1, 63-1, 64-1, 65-1, 66-1, 67-1, 68-1, 69-1, 70-1, 71-1, 72-1, 74-1, 75-1, 76-1, 77-1, 78-1, 79-1, 82-1, 83-1, 85-1, 87-1, 96-1, 104-1, 107-1, 118-1, 131-1, 133-1, 134-1, 136-12, 140-1, 144-1, 147-1, 203-1, 204-1, 205-1, 209-1, 210-1, 211-2, 215-1, 224-1, 225-4, 228-1, 231-1, 254-1, 604-4, 607-1, 608-1, 609-1, 610-1, 611-1, 612-1, 613-1, 614-1, 615-1, 616-1, 617-1, 618-1, 619-1, 620-1, 621-1, 622-2, 625-1, 626-1, 627-5, 628-3, 629-1, 708-1, 709-1, 710-2, 714-1, 715-1, 716-1, 718-1, 719-3, 803-10, 821-1, 827-1, 831-1

Response: DOE acknowledges that there is both support for and opposition to the Bellefonte option. The reasons cited by supporters and opponents have been discussed in the CLWR EIS and also have been the subject of specific comments and responses elsewhere in this document. Specifically: The need for tritium and national defense are discussed in Volume 1, Chapter 2 of the EIS and in response to Comment Summary 02.01. Cost is discussed in the response to Comment Summary 23.16. The issue of separation between military and civilian programs is discussed in the response to Comment Summary 01.09. The issue of nonproliferation is discussed in response to Comment Summary 01.04. Issues related to public health and safety from radiological releases are discussed in responses to Comment Summaries 14.04 and 15.03. Socioeconomic issues are discussed in Chapter 5 of the EIS and in response to comment summaries in Category 13.

07.04 Several commentors support the use of the TVA plants in general and Bellefonte in particular for implementing the proposed action. The commentors express several reasons for their support including safety; small environmental effects; efficiency; less risk that other everyday activities; design superiority (Bellefonte) over other plants; nuclear energy's advantages as a clean and safe power source; safe practices on the part of TVA and its employees; advantages for Jackson County (Bellefonte), Alabama, and surrounding areas in Tennessee and Georgia; and the safety record of the nuclear industry. Several commentors oppose the use of TVA facilities for the production of tritium.

Comments Summarized: 141-1, 245-3, 610-6, 622-1, 627-1, 628-1, 710-1, 711-1, 717-1, 719-5, 828-3, 835-5

Response: DOE assesses the environmental impacts of the proposed action at each of the TVA reactor units in Volume 1, Chapter 5 of the CLWR EIS. The commentors' support for the proposed action and the specific support of some of the commentors for Bellefonte is noted. DOE acknowledges that there is both support and opposition to the use of TVA facilities for the production of tritium.

07.05 Commentors oppose the proposed action on the basis of an "increased likelihood of environmental contamination" and "adverse effects" even at low levels of radiation exposure. One of the commentors suggests that DOE should not further develop nuclear energy.

Comments Summarized: 32-3, 102-3

Response: As discussed in Volume 1, Chapter 5 of the CLWR EIS, the environmental impacts and potential doses to the public from the proposed action are well within limits considered acceptable by regulatory authorities. Sections 5.2.1.9, 5.2.2.9, and 5.2.3.9 of the EIS provide the results of the analyses of the incremental risk resulting from normal operation and hypothetical accident scenarios during tritium production. These analyses are performed using a generally accepted method for design-basis and beyond design-basis accident analyses in support of the reactor operations promulgated by the NRC. The analyses use special models for the evaluation of consequences of accidental releases of tritium (both in elemental and tritiated water vapor) to the environment. Volume 1, Appendix C, Section C.2.2, of the EIS summarizes the characteristics and biological health effects of tritium. This appendix also provides the health effect standards that were used to estimate the potential lifetime cancer mortalities resulting from the exposure to tritium and other radioactive materials. Health effects were calculated using a linear extrapolation from the nominal risk estimated for lifetime total cancer mortality at a dose of 10 rad to a very low dose level, i.e., a zero dose. The impact from the application of this model is considered to be an upper-bound estimate. There is scientific uncertainty about cancer risk in the low-dose region below the range of epidemiologic observation, and the possibility of no risk, or even a health benefit, cannot be excluded. The low-dose region is defined as a dose level (~0.01 rad) where DNA repair can occur in a short period (a few hours) after irradiation-induced damage. DOE considers the use of CLWRs to produce tritium to be a viable, cost-effective, safe, and environmentally-sound alternative, and not necessarily a promotion of nuclear energy.

07.06 Several commentors express their preference that the Bellefonte plant be converted into a fossil fuel plant.

Comments Summarized: 11-1, 12-3, 98-2, 232-5, 704-14, 806-7

Response: Volume 1, Section 1.5.2.4 of the CLWR EIS discusses the Bellefonte Conversion Project EIS. As stated in that section, if these reactors will not be utilized in the CLWR program, one of the five alternatives addressed in the *Final Environmental Impact Statement for the Bellefonte Conversion Project* (TVA 1997) could be selected in the Record of Decision for that EIS.

07.07 Several commentors express support for the Watts Bar/Sequoyah option, stating it would permit the Tennessee Valley area to receive benefits in addition to the production of electricity; it is the least environmentally destructive option; and it provides greater flexibility at the least cost.

Several other commentors express opposition to the Watts Bar/Sequoyah option, citing numerous reasons including: increased risk to local residents, no economic benefit, adverse effects on the region's power supply, and no increase in jobs.

Comments Summarized: 201-1, 226-1, 229-1, 230-1, 232-7, 233-1, 235-5, 246-1, 251-1, 252-1, 255-1, 806-9, 829-5

Response: DOE acknowledges that there is both support for and opposition to the Watts Bar/Sequoyah alternative, which is the Preferred Alternative in the CLWR EIS. The reasons cited by supporters and opponents are discussed in the EIS and also are the subject of specific comments and responses elsewhere in the document. Public health and safety issues are discussed in Chapter 5 of the EIS, and also in response to Comment Summaries 14.04 and 15.03. Socioeconomic issues, such as jobs, are both discussed in Chapter 5,

as well as in response to Comment Summaries in Category 13. Cost issues are discussed in response to Comment Summary 23.16. The commentors are also referred to the responses to Comment Summaries 7.03 and 7.04.

07.08 During the December 14, 1998, meeting a number of commentors compared the Bellefonte alternative to the Watts Bar/Sequoyah alternative. Those in favor of Bellefonte feel that it would: (1) provide more electricity, not less, as would happen at Watts Bar and Sequoyah during shutdowns needed to produce tritium; (2) help stabilize electrical costs, since TVA would not have to buy power during periods of high demand; (3) be cheaper, since the sale of electricity would pay back the tax dollars spent to build the plant; (4) provide economic benefits, including jobs, to the region; (5) produce tritium for a longer period of time; (6) benefit area ratepayers and taxpayers; (7) salvage an existing government asset; (8) provide national benefits, such as the lowest cost to the taxpayer; and (9) generate power without greenhouse gases. Some commentors also point out that, compared to Watts Bar/Sequoyah, Bellefonte is strongly supported by the local population (including politicians, businessmen, labor unions, and educators) and many supporters have worked hard to promote tritium production at the site.

Some commentors, after comparing the alternatives, favor the Watts Bar/Sequoyah alternative over the Bellefonte alternative since it would: (1) use an existing facility; (2) avoid creating new health risks and environmental concerns; (3) not impact new population areas; (4) cost less; (5) cause the least harm to biological entities; and (6) offer the greatest flexibility at the least cost, given the future likelihood of additional weapons reductions.

Comments Summarized: 214-1, 216-1, 219-1, 220-1, 221-1, 227-2, 233-2, 234-1, 236-1, 237-1, 238-1, 240-1, 242-3, 243-1, 244-1, 249-4, 814-2, 820-1, 822-1, 823-1, 824-2, 826-1, 830-1, 832-3, 833-1, 834-1

Response: DOE recognizes that there are advantages and disadvantages to both the Bellefonte alternative and the Watts Bar/Sequoyah alternative. In designating the Preferred Alternative, the Secretary of Energy considered a variety of factors including cost, schedule, flexibility, environmental impacts, and the ability to meet statutory requirements. Based upon these factors, the Secretary judged the Watts Bar/Sequoyah alternative preferable to Bellefonte. A final decision will not be made until at least 30 days after the EPA Notice of Availability for the CLWR Final EIS is issued.

CATEGORY 08: DOE PAST PRACTICES

08.01 One commentor opposes transportation of TPBARs to the Savannah River Site for extraction because the Savannah River Site cleanup "doesn't seem to be accomplishing its goal," and the commentor doesn't want South Carolina to become a dump or storage site for nuclear and radioactive waste.

Comment Summarized: 18-2

Response: DOE has a very aggressive cleanup program and has worked with the EPA, states, stakeholders, and the general public to develop long-range programs and commitments to clean up its facilities to acceptable levels. While the commentor's opinion that DOE's clean-up actions are not accomplishing its goal are noted, this comment is beyond the scope of the CLWR EIS. The impacts of low-level wastes associated with the proposed action to produce tritium at one or more CLWRs are addressed in Volume 1, Sections 5.2.1.11, 5.2.2.11, and 5.2.3.11 of the CLWR EIS. Impacts associated with wastes from tritium extraction are addressed in the Tritium Extraction Facility EIS (DOE/EIS-0271) (DOE 1998a, DOE 1999b).

08.02 Commentors suggest that DOE has a record of polluting and contaminating every site they have operated and that the CLWR program will be no different. One commentor contends that the K-Reactor should be utilized so that other sites will not be polluted by DOE. Another commentor contends that, since the K-Reactor at the Savannah River Site has been contaminated beyond reasonable or economical expectation for clean-up, it is difficult to see why the need for environmental upgrades are a reasonable excuse for this facility not to be considered as a reasonable alternative. One commentor indicates that among other deficiencies in cleanup activities, DOE has failed to site a nuclear repository and, therefore, its ability to operate a CLWR program is in serious question. Another commentor indicates that in December 1991, coolant contaminated with tritium leaked into the Savannah River from a DOE reactor. Another commentor states that the CLWR EIS does not give the history of environmental and health problems around DOE tritium facilities.

Comments Summarized: 36-1, 41-4, 58-2, 103-3, 132-2, 136-3, 137-1, 211-3, 217-3, 252-3, 507-2, 707-7, 720-2, 800-9, 803-3

Response: DOE recognizes that it has facilities which require some level of environmental cleanup. Similar to other industries, most of the DOE facilities were designed and constructed in the 1940s and 1950s, prior to today's environmental requirements, when the understanding of waste management principles was not what it is today. Over the past several years, DOE has had a very aggressive facility modernization and cleanup program and has worked with the EPA, states, Tribal Nations, stakeholders, and the general public to develop long-range programs and commitments to cleanup its facilities to acceptable levels. To date, the Department has completed numerous cleanup activities and is aggressively working toward the cleanup of its remaining environmental problems. Actions taken to implement the CLWR tritium program would not be inconsistent with nor impact these ongoing cleanup activities, since the cleanup activities of the DOE are funded and managed separately.

In regard to the use of the K-Reactor at the Savannah River Site, this option was evaluated by the Final Programmatic EIS (DOE 1995), but dismissed from further consideration for the reasons stated in Section 3.1.3 of that document and summarized here. The K-Reactor was designed in the 1940s and was utilized for the production of tritium and other nuclear materials until 1988. At that time, the facility was shut down for major environmental, safety, and health upgrades to comply with today's stringent standards. The commentor is correct in that, during the effort to restart the K-Reactor, tritium-contaminated coolant was released into the Savannah River. Despite a great number of improvements, it was finally decided that the facility was too old and that the additional cost of upgrades sufficient to enable it to comply with the Department's existing standards were too great. If the K-Reactor were to be used, the environmental problems associated with the past use of this facility must be remedied in accordance with the Federal Facilities Act and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements.

In regard to DOE's ability to carry out the CLWR program, the Department has demonstrated a competency in leading the industry in the use of nuclear energy and in the protection of human health and safety. DOE has pioneered the development of energy-efficient products, space exploration technology, medical treatment procedures, and a long list of other noted accomplishments. The focus of the CLWR EIS is to assess the potential environmental impacts associated with the production of tritium at each of the five TVA reactors being considered. A history of environmental and health issues associated with DOE facilities, as well as other DOE programs such as the nuclear repository, does not fall within the scope of this EIS.

DOE is committed to improving its environmental management, to operating its facilities in a manner that meets or exceeds all applicable environmental, safety, and health requirements, and to the cleanup of its environmental problems. The alternatives being considered for the production of tritium in a CLWR all propose the utilization of state-of-the-art TVA reactors. These reactors have excellent environmental compliance records and exemplary environmental, health, and safety programs to assure continued compliance.

In addition, as discussed in response to Comment Summary 05.10, DOE has confidence that the use of TPBARs in a CLWR is safe and technically straightforward.

08.03 A commentor would like to know where tritium has been produced and what studies have been conducted that show its effect on the environment.

Comments Summarized: 213-1, 818-1

Response: Volume 1, Section 1.3.3 of the CLWR EIS presents a brief discussion of the history of tritium production. Appendix C discusses the properties of tritium and its effects on the environment. Section C.2.1.2 presents a discussion of health effects including references to the National Research Council's Committee on the Biological Effects of Ionizing Radiation (BEIR) reports. Section C.2.2 presents a discussion of tritium characteristics and biological properties including references to International Commission on Radiological Protection (ICRP) publications.

08.04 A commentor mentions a 12-year tritium leak to groundwater from a spent fuel holding tank at Brookhaven National Laboratory and notes that public trust of the management of any nuclear reactor or research laboratory anywhere in the world is slim. Further, the commentor questions the faith that industry and the NRC put in nuclear science to find answers to industry problems.

Comments Summarized: 248-6, 819-1

Response: The tritium leak at Brookhaven National Laboratory involved material that leaked from an unlined spent fuel pool. All the TVA reactor facilities include linings in the design of their spent fuel pools.

CATEGORY 09: TVA PAST PRACTICES

09.01 One commentor states that he lives about 2 miles from Watts Bar and feels quite safe and confident that the plant is being operated safely. Another commentor expresses confidence in TVA's track record.

Comments Summarized: 26-2, 58-5

Response: As discussed in Volume 1, Section 6.5 of the CLWR EIS, TVA operates all its reactor facilities within all state and Federal regulations.

09.02 The commentor expresses a serious concern regarding the ability of DOE and TVA to carry out this project successfully. The commentor suggests that the EIS needs to point out changes in these organizations that have or will be taking place to give assurance that the project will be handled properly and in accordance with this EIS. The commentor also suggests that the EIS perform an evaluation on the "specified candidates" capabilities to carry out the project. Referring to Section 6.5.3.1, the commentor cites various examples of past TVA experiences which, according to the commentor, point to TVA's inability to manage the program in an environmentally acceptable manner.

Comment Summarized: 41-5

Response: TVA's capability to successfully carry out the project is inherently a major consideration in DOE's decision process. In 1985, TVA made the decision to voluntarily shut down its nuclear units because of technical deficiencies and the absence of an effective management system in the nuclear program. In response to this situation, TVA restructured its nuclear organization, strengthened its management system, and

successfully implemented a comprehensive recovery plan to address the identified deficiencies and regulatory concerns. This strengthened management system demonstrated TVA's ability to recover the nuclear program, and the agency continues to successfully manage the program as one of the leading performers in the industry. TVA's management takes very seriously any identified problems and violations of any level. Corrective actions are taken as soon as possible, and recurrence controls are put in place. While Sequoyah had a number of violations identified during the mentioned time frame, the overall trend of violations continues to decrease and the majority of those received recently have been characterized as having low safety significance. Watts Bar Unit 1 was designed, built, and is operated to high standards and adheres to strict regulations to ensure the health and safety of the public and TVA employees. Since successfully completing startup activities and beginning commercial operation in May 1996, Watts Bar has demonstrated excellent performance and set world records during its first-cycle operation and refueling outage. Two years in a row, the plant received from the NRC's Systematic Assessment of Licensee Performance evaluation a "superior" rating in three of four performance categories and a "good" in the remaining category. Volume 1, Sections 6.5.2 and 6.5.3 of the CLWR EIS present a discussion of Institute of Nuclear Power Operations reports for the Watts Bar and Sequoyah plants.

09.03 The commentor, referring to Section S.1.5.5 (Summary) of the CLWR Draft EIS remarks that producing tritium in a TVA reactor is not consistent with the Congressional purposes that established TVA. The commentor notes that its establishment in 1933 had no bearing whatsoever to "national defense," although later it was further developed to ensure a reliable supply of electricity for Oak Ridge. The commentor recommends that the insinuation be removed. Another commentor suggests that tritium production is an expansion of TVA's responsibilities from power production to weapons production, and asks whether tritium production would influence TVA to move further into weapons and defense-related activities.

Comments Summarized: 41-6, 815-3

Response: The commentor is correct that TVA has provided electricity to the defense mission at Oak Ridge. One of the key reasons for constructing TVA's Shawnee Fossil Plant near Paducah, Kentucky, was to provide electricity to DOE's uranium enrichment plant at that location. The CLWR EIS Summary, Section S.1.5.5, and Volume 1, Section 1.3.6, provide an accurate summary of the TVA Act, so a revision of the text is unnecessary. The preamble to the TVA Act identifies national defense as one of the purposes for TVA's creation. Further, the TVA Act in Sections 15(h) and 31 indicates that the Act should be liberally construed to aid TVA in discharging its responsibilities for the advancement of national defense and other statutory purposes. In compliance with that Congressional mandate, TVA has supported the nation's defense efforts on numerous occasions since its creation in 1933. TVA produced phosphorus and ammonium nitrate for explosives and munitions during World War II and the Korean Conflict. From 1952 to 1957, TVA, under an agreement with the Department of the Army, operated and maintained the Phosphate Development Works complex, at which various phosphorus-based chemical agents were produced. From 1985 to 1998, under a contract with the Department of Defense, the Phosphate Development Works was refurbished and reactivated to process and purify the United States' remaining stock of a nerve agent component (methyl phosphoric dichloride). TVA continues to support defense missions today with the cleanup of chemical and munitions production and storage sites, as well as stabilization or disposal of surplus chemical weapons stockpiles. Thus, tritium production is not an expansion of TVA's defense role nor would it influence TVA with regard to any future defense-related activities. The text referred to by the commentor in the CLWR EIS Summary, Section S.2, and Volume 1, Chapter 2, is accurate.

09.04 The commentor asserts that the Bellefonte plant would put radiation into the water and the air. The commentor further remarks that, according to his understanding, the plant was stopped before because of the high cost of meeting the environmental requirements and wonders how the requirements would be met now. The commentor is interested in receiving documentation on the plan for this action.

Comment Summarized: 49-2

Response: Radioactive effluents from nuclear facilities are strictly controlled and regulated in the United States by state and Federal regulations for the protection of the environment and the health and welfare of the public. Although the operation of Bellefonte, as analyzed in Volume 1, Section 5.2.3.9 of the CLWR EIS, would result in radioactive discharges, resultant air and water concentrations would be well below established regulatory limits. As stated in the CLWR EIS, Bellefonte was initially deferred in 1988 because of diminished growth in TVA's customer power needs. In 1994, the TVA Board of Directors decided that the Bellefonte Nuclear Plant would not be completed unless financial partners could be found. The cost of environmental controls was not a factor in this decision.

09.05 The commentor asks, "What is the basis for using Institute of Nuclear Power Operations reports to defend using TVA's CLWRs when the public does not have access to those reports and cannot get them?" The commentor suggests that the public is at a vast disadvantage responding to this EIS on that basis alone.

Comment Summarized: 86-7

Response: As stated in Volume 1, Section 6.5.1 of the CLWR EIS, the purpose of the section that describes compliance indicators is not for DOE to assess the adequacy of TVA's operation of its CLWRs, but to provide a basis to assess whether there are any compliance issues that would interfere with the production of tritium. The Institute of Nuclear Power Operations performance indicators are appropriately mentioned in this section, as they are used by individual nuclear plants to help them improve their operations by measuring them against established standards of excellence that apply across the industry. The Institute of Nuclear Power Operations restricts distribution on all plant-specific performance reports, and no one in the industry releases their complete reports to other utilities or to the public. Distribution is restricted to encourage candor in communications between the Institute of Nuclear Power Operations (the auditor) and the nuclear plant being audited. While the Institute of Nuclear Power Operations reports are confidential, NRC Systematic Assessment of Licensee Performance reports are made available to the public, including all input material such as data from the Institute of Nuclear Power Operations. All regulatory violations, whether they are self-identified or not, are described in the NRC Systematic Assessment of Licensee Performance reports and are made available to the public.

09.06 The commentor remarks that the CLWR Draft EIS reports very small numbers of abused employees that have been harmed as a result of raising safety issues. The commentor inquires about the source of these numbers. The commentor also inquires as to how TVA, the NRC, and DOE will ensure a safety-conscious work environment where employees feel free to raise safety issues without damage to them, their families, or their careers.

Comments Summarized: 86-11, 703-13

Response: Over the past several years, TVA has developed several means to monitor the safety consciousness of its workforce. Periodic surveys of employee attitudes regarding employee/management communication of safety concerns are conducted by TVA's Office of Inspector General. TVA's Nuclear Concerns Resolution Staff is a separate organization outside the normal nuclear management chain that provides an alternative path for employees to communicate any safety or quality concerns. Through a standard exit interview process, the Concerns Resolution Staff also provides employees and contractors leaving employment an opportunity to raise any concerns and voice their opinions about employee/management communication. TVA management tracks and trends employee grievances and U.S. Department of Labor complaints arising from allegations of intimidation and harassment in order to gauge the effectiveness of its safety-conscious work environment efforts. In the early 1990s, dozens of Department of Labor cases were filed within TVA Nuclear. No Department of Labor cases were filed in 1998. Employee surveys in recent years indicate that approximately

98-99 percent of the employees and contractors feel free to raise safety concerns with their direct management without reprisal. The CLWR EIS does not include a discussion on the numbers of abused TVA employees that have been harmed as a result of raising safety issues. Volume 1, Sections 6.5.2.1 and 6.5.3.1 of the CLWR EIS discuss Notices of Violation which imposed civil penalties regarding alleged acts of discrimination. The source of this information is the NRC.

09.07 The commentor remarks that, in attempting to discuss current projections for future energy demands in Section 1.3.6, the CLWR Draft EIS does not make clear whether TVA's projections include conservation measures to reduce demand and/or development of renewable energy resources.

Comment Summarized: 94-8

Response: TVA's projected customer power needs will be met using new generation resources, as well as efficiency improvements to TVA's existing generation resources. Additionally, changes in customer end-use (demand-side) efficiencies, such as conservation, are a factor in power need projections. Some of these end-use efficiencies result from programs carried out by TVA and the distributors of TVA power. TVA's *Energy Vision 2020, Integrated Resource Plan Environmental Impact Statement* (TVA 1995) presents both short-term and long-term TVA plans for demand-side management and customer service programs. A program is now in the planning stages that would add additional renewable energy resources such as wind energy and solar energy to TVA's generation system.

09.08 A commentor, referring to Section 3.2.l of the CLWR Draft EIS where the assumption is made that the Bellefonte plant would be completed by 2005, states that the CLWR EIS should be subjected to a reality check, and more reasonable projections should be used based on progress thus far on Bellefonte and the schedule of Watts Bar 1. Another commentor asks whether the schedule for completing Bellefonte 1 is hypothetical or real. The commentors also recommend that the CLWR EIS, in determining the reasonableness of completing Bellefonte for tritium production by 2005, should provide information on how complete Bellefonte currently is, how realistic the 2005 date is, and what size of spent nuclear fuel cooling pool is being (or has been) designed and constructed.

Comments Summarized: 94-17, 500-1

Response: The schedule for completing Bellefonte Nuclear Plant Unit 1 is consistent with DOE's tritium requirement. The schedule for the completion is based on sound assumptions and experience gained through prior operation. It has been reviewed extensively by outside experts, such as Bechtel, Ebasco, and Fluor Daniel. In Volume 1, Section 3.2.2, the CLWR EIS states that Bellefonte Unit 1 is 90 percent complete while Unit 2 is 57 percent complete. The reasonableness of the 2005 completion date has been reviewed. Irrespective of the completion schedule for Bellefonte, it is likely that the first core load of TPBARs would be irradiated in the Watts Bar plant. As discussed in Volume 1, Section 4.2.3.11, the spent fuel pool for Unit 1 is constructed and will be able to store 1,058 spent fuel assemblies. This capacity would be sufficient to store 20 years of operation without alternate storage means.

09.09 The commentor states that, as someone who grew up in the shadows of Watts Bar and remembers reading the newspaper articles and what it took to bring that facility on line, he is appalled that DOE would even discuss Watts Bar.

Comment Summarized: 503-5

Response: Watts Bar Unit 1 was designed, built, and is operated to high standards and adheres to strict regulations to ensure the health and safety of the public and TVA employees. Since successfully completing startup activities and beginning commercial operation in May 1996, Watts Bar has demonstrated excellent

performance (see Volume 1, Section 6.5.2.1). Its first operating cycle was the best first cycle for the first unit of any plant in the United States. For Fiscal Year 1998, Watts Bar set a new site generation record and had the best first-cycle refueling outage for U.S. plants in the past decade. For the second time in a row, the plant received from the NRC's Systematic Assessment of Licensee Performance evaluation a "superior" rating in three of four performance categories and a "good" in the remaining category.

09.10 A commentor points out that the primary coolant systems at Sequoyah and Watts Bar are of a recognized bad design and are virtually inoperable at any given time. The commentor expresses concern that this has received little or no attention by TVA or DOE, and that ratepayers should not be responsible for their mismanagement.

Comments Summarized: 241-4, 811-7

Response: The design of the Watts Bar and Sequoyah reactors has been thoroughly reviewed and licensed by the NRC. TVA operates its plants in compliance with all NRC requirements and all other applicable regulations. Volume 1, Chapter 6 of the CLWR EIS describes the regulatory compliance history of both Watts Bar and Sequoyah.

CATEGORY 10: LAND, AESTHETICS, NOISE, SOILS, GENERAL ENVIRONMENT

10.01 The commentor expresses concern that the plume from operation of the cooling tower would result in odors in the valley.

Comment Summarized: 12-4

Response: The cooling tower plume associated with operation of a nuclear reactor is a water vapor plume and would not result in any detectable odor.

10.02 The commentor expresses concern that DOE has not provided adequate information on soils and geology with which to evaluate storage options, other future structures, and the protection of groundwater from wastes at Bellefonte.

Comment Summarized: 116-20

Response: DOE believes that the information provided on geology and soils for Bellefonte in Volume 1, Section 4.2.3.5 of the CLWR EIS is adequate for the level of impacts anticipated and discussed in Section 5.2.3.5. Extensive evaluations of soils and bedrock on the Bellefonte site were conducted prior to the construction of Bellefonte Units 1 and 2. These evaluations are discussed in the *Bellefonte Nuclear Plant Final Safety Analysis Report* (TVA 1991) and in the *Final Environmental Statement, Bellefonte Nuclear Plant Units 1 and 2* (TVA 1974). The *Final Environmental Impact Statement for the Bellefonte Conversion Project* (TVA 1997) also summarizes geological and soil conditions at the site. The last two documents serve as a baseline on which the environmental impacts associated with tritium production are assessed. Although the characteristics of soils can play a role in controlling spills of fuels, oils, solvents, or other chemicals, the primary controls are engineered controls and mitigation measures as provided in the site Spill Prevention, Control, and Countermeasures Plan. The environmental impacts from the construction and operation of the dry cask Independent Spent Fuel Storage Installation (ISFSI) are addressed in Volume 1, Section 5.2.6 of the CLWR EIS. However, no decision will be made to either construct or operate a dry cask ISFSI as a result of this EIS. Appropriate NEPA documentation would be prepared prior to the construction of such a facility.

10.03 Commentors are opposed to tritium production in general or at Bellefonte in particular because of the increased risk of environmental contamination.

Comments Summarized: 29-1, 37-1, 84-1, 98-1, 139-1, 212-7, 712-1

Response: The radiological releases to the environment that could result from the proposed action under normal operating conditions and various hypothetical accident scenarios are conservatively estimated in Chapter 5 of the EIS for each candidate reactor site. The potential impacts to the environment and the radiological doses and risks to the public from these releases also are assessed and discussed in Chapter 5. The assumptions and methodology used for the assessment are discussed in detail in Volume 1, Appendix C and D of the CLWR EIS for normal operation and accident conditions, respectively. The methodology used is based on scientific standards accepted in the industry and dictated by Federal and state regulatory authorities. As discussed in Volume 1, Chapter 5 of the CLWR EIS, the environmental impacts and the potential doses to the public are well within limits considered acceptable by the regulatory authorities. The potential environmental impacts resulting from the operation of Bellefonte specifically are addressed in Section 5.2.3 of the CLWR EIS.

10.04 One commentor states that any pollution problem would not be greater than that which already exists for the TVA area. Other commentors suggest that the East Tennessee region is already overflowing with toxic materials from both local industry and DOE operations and cannot handle any more toxic wastes.

Comments Summarized: 103-1, 211-1, 248-7

Response: Volume 1, Chapter 5 of the CLWR EIS analyzes the range of potential impacts which could occur at each of the three TVA plants. These impacts were determined to be within regulatory limits for each of the alternatives. Existing environmental conditions within the TVA area as they relate to the operation of the TVA reactors as tritium-producing plants are described in Volume 1, Section 4.2, Affected Environment.

CATEGORY 11: AIR, WATER RESOURCES

11.01 The commentor asks the following: What is the current wastewater program that the TVA nuclear programs use to clean up the reactor coolant waste water prior to release into the Tennessee River? Where is the procedure for that and how often is that program tested to support its reliability? What are the criteria that the NRC will use to monitor that program? Where are those criteria located now?

Comments Summarized: 86-9, 703-1

Response: As described in Volume 1, Sections 4.2.1.4 and 4.2.2.4 of the CLWR EIS, the radionuclide contaminants in the primary coolant are the source of liquid radioactive waste at the Watts Bar and Sequoyah plants. Each source of liquid waste receives an individual type of treatment before discharge to the environment under the National Pollutants Discharge Elimination System (NPDES) permit. The CLWR EIS presents the amount of radioactive liquid effluent to the Tennessee River in Volume 1, Tables 5-2, 5-12, and 5-30, and presents potential tritium concentration in the river in Tables 5-3, 5-13, and 5-31. TVA Nuclear contracts with a vendor to process the reactor coolant wastewater and to ensure any radioactivity is well within the established regulated limits prior to release to the Tennessee River. The vendor is responsible for supplying and operating the liquid waste processing system. Prior to system use, the vendor supplies to TVA for review a "Process Control Program" that describes the available processing vessels, operating parameters, and suggested removal criteria for the various media utilized in the vessels. Vendor operating procedures also are submitted for TVA's review. Prior to each batch of processed water being released to the Tennessee River,

an analysis is performed to identify the radioactive species present. This analysis also determines each pollutant's rate of discharge and the total activity to be released to the Tennessee River and compares these estimates to the regulatory limits for each pollutant. These releases are well below the allowable activity limits presented in 10 CFR 20. The NRC monitors and inspects conformance to the 10 CFR 20 release limits.

11.02 The commentor states that the document should explain whether the operational limits for a plant would be changed to produce tritium and whether those changes might affect the NPDES permits under which that plant now operates.

Comment Summarized: 126-3

Response: Volume 1, Sections 5.2.1.4 and 5.2.2.4 have been revised to clarify that TVA does not envision any changes to the operational limits that might affect the NPDES permits for the Watts Bar and Sequoyah plants.

11.03 Two commentors recommend that DOE should consider background and downstream monitoring of the facilities.

Comments Summarized: 126-4, 129-1

Response: TVA presently monitors downstream of the release point at Watts Bar and Sequoyah, and will monitor downstream of the Bellefonte release point (once Bellefonte begins operation) in accordance with regulatory requirements. The NRC requires that the monitoring for tritium detects at a level of 2,000 picocuries per liter. TVA monitors more conservatively than the NRC requirement and can detect at levels of 300 picocuries per liter. In addition to monitoring liquid effluent pathways, TVA also monitors releases via air pathways. In accordance with regulatory requirements, TVA routinely files environmental reports with the NRC and state agencies that identify and quantify scheduled and unscheduled liquid and air pathway releases to the environment. These reports also identify the consequences of these releases (i.e., doses) on the general population.

11.04 The commentor asks: (1) who is ultimately accountable for determining how much tritium can be released into the Tennessee River; (2) who has the authority to determine whether the procedures for the current wastewater program are correct; and (3) whether the current program is capable of providing complete and accurate numbers for the amounts of tritium that would be released into the river.

Comment Summarized: 703-2

Response: All commercial power reactors discharge liquid and gaseous tritium during operation. The NRC and EPA are statutorily responsible for setting discharge limits for radionuclides (including tritium) and enforcing those limits. TVA is responsible for meeting those limits and demonstrating compliance with them. All nuclear plant discharges are sampled and/or monitored to verify that they are within applicable limits. The instrumentation involved is periodically calibrated to ensure accuracy. In addition, TVA has a comprehensive radiological monitoring program which samples airborne and terrestrial pathways between the plant and the surrounding population to verify that all human exposure limits are met. All samples are analyzed at TVA's Western Area Radiological Laboratory in Muscle Shoals, Alabama. All analyses are conducted in accordance with written and approved procedures and are based on accepted methods. The Radiological Laboratory employs a comprehensive quality assurance/quality control program to monitor laboratory performance throughout the year. The program includes equipment checks to ensure that the radiation detection instruments are working properly and analysis of the quality control samples are included alongside routine environmental samples. The laboratory participates in the EPA Interlaboratory Comparison Program. In addition, samples

are split with the EPA National Air and Radiation Environmental Laboratory, and applicable state agencies provide an independent verification of the overall performance of the laboratory.

The answer to the commentor's three points are: (1) the NRC regulates how much tritium can be released, (2) the NRC establishes the wastewater program requirements, and (3) the current program is considered to provide an accurate assessment of any tritium released into the Tennessee River.

11.05 The commentor asks whether a National Emission Standard for Hazardous Air Pollutants for radionuclides is applicable to tritium production.

Comment Summarized: 143-4

Response: As discussed in Volume 1, Section 6.2.2, National Emission Standards for Hazardous Air Pollutants for radionuclides (40 CFR 61, Subparts H and I) are not applicable to NRC-licensed facilities such as the TVA reactors. [See National Emission Standards for Radionuclide Emissions from Facilities Licensed by the Nuclear Regulatory Commission and Federal Facilities Not Covered by Subpart H, Final Rule, 60 FR 46206 (September 5, 1995).] Radioactive emissions, including tritium, are regulated by the NRC (10 CFR 50, Appendix I, 40 CFR 190, and 10 CFR 20). Furthermore, as indicated in Volume 1, Sections 5.2.1.9.1 and 5.2.2.9.1, impacts from radioactive emissions from tritium production at Watts Bar or Sequoyah would be small. Section 5.2.3.9.1 presents the expected impacts from radioactive emissions from tritium production at the Bellefonte Nuclear Plant. The EPA decided that compliance with NRC regulations constitutes compliance with 40 CFR 61.

11.06 The commentor suggests that the statement on page 5-39 of the CLWR Draft EIS, which says that studies of natural draft cooling towers in England approximate the performance of natural draft cooling towers in the southern United States, needs amplification. The commentor asserts that there are significant climate differences between these two areas.

Comment Summarized: 146-12

Response: The commentor is concerned that the cooling tower solids deposition rate presented in the CLWR Draft EIS may not be representative of the Bellefonte cooling towers. The text has been revised in the CLWR Final EIS to present the estimated solids deposition rate near the Bellefonte cooling towers.

11.07 One commentor suggests that adverse impacts to water quality have not been analyzed properly in the EIS and that there is a lack of data on impacts from previous diversions. Specifically, a commentor suggests that data presented in Tables 5-22 and 5-23 are outdated and that concentrations of pollutants from Bellefonte during operation need to be presented. The commentor states that the following statement does nothing to ease one's mind: "Water required from the Guntersville Reservoir would be a small fraction of the river flow, and most of it would be returned to the reservoir after use." (CLWR Draft EIS p. 5-42).

Comment Summarized: 116-21

Response: The CLWR EIS also analyzed the potential radiological water quality impacts associated with operation of Bellefonte 1 or Bellefonte 1 and 2 for tritium production. The results of these analyses, presented in Volume 1, Section 5.2.3.4 of the CLWR EIS, indicate that concentrations of tritium in the Tennessee River resulting from the operation of the plant would be well below limits established by the EPA for drinking water. Discharges and concentrations in the reservoir would meet the limitations of the NPDES Permit and Alabama Department of Environmental Management drinking water standards, which have been set to protect the public drinking water supply.

Water use by other users withdrawing water from the Guntersville Reservoir is discussed in Volume 1, Section 4.2.3.4 of the CLWR Final EIS. Tables 5-28 and 5-29 (formerly Tables 5-22 and 5-23) have been revised to agree with the more recent water quality monitoring data for Guntersville Reservoir presented in Table 4-26. Revised concentrations in the reservoir after effluent mixing have been included in the tables.

11.08 The commentor notes that, on page 5-33 of the CLWR Draft EIS, the Watts Bar 1 radioactive effluent is given as 14,850 Curies per year. The commentor asks whether this effluent impacts the surface water and, if so, why there is no change to water quality conditions.

Comment Summarized: 22-2

Response: The CLWR EIS analyzes the potential water quality impacts associated with operation of Watts Bar 1 for tritium production. The results of these analyses, presented in the revised Volume 1, Section 5.2.1.4 of the CLWR EIS, indicate that concentrations of tritium in the Tennessee River resulting from tritium production at the plant would be well below limits established by the EPA for drinking water. It should be noted that the radioactive effluent from each of the reactors has been modified to eliminate the contribution from two failed TPBARs. TPBAR failure is considered an abnormal event and the resulting release of radioactive materials from this event would not occur on an annual basis.

11.09 The commentor asks the distance between the Bellefonte plant's point of discharge into the river and the point where the Jackson County Water Department draws water from the river for public use. Further, upon hearing the answer is 4.5 miles, the commentor asks if the public water source that was measured is the one for Fort Payne. The commentor also asks the location of the other public water sources in Jackson County and their distance from the Bellefonte plant's discharge point.

Comment Summarized: 606-1

Response: The nearest municipal water intake is for Fort Payne at Tennessee River Mile 387.6, 2.7 miles downstream of the TVA Bellefonte effluent diffuser. The next nearest municipal water intake is for Scottsboro at Tennessee River Mile 385.8, 4.5 miles downstream of Bellefonte, at the Comer Bridge (Alabama Route 35). Scottsboro provides water to Jackson County from this intake. Other water supply intakes near Bellefonte are listed in Volume 1, Section 4.2.3.4, and Table 4-27 of the CLWR Final EIS.

11.10 The commentor claims that DOE failed to discuss the impacts of the proposed action on surface and groundwater. The commentor further opines that, although the Department concedes that there will be an impact to the water quality, it did not address monitoring. The commentor suggests that, since tritium oxide is chemically identical to water, it cannot be filtered out of the water, implying that monitoring for tritium after it has been released is too late.

Comment Summarized: 116-17

Response: Volume 1, revised Sections 5.2.1.4, 5.2.2.4, and 5.2.3.4 of the CLWR Final EIS discuss potential releases of tritium to surface waters around each site and address potential tritium concentrations. As discussed in these sections, the resulting tritium concentration in these waters would be well within the drinking water limit established in the Safe Drinking Water Act. Plant procedures associated with any tritium monitoring would be approved by the NRC. With respect to groundwater, the EIS concludes that groundwater quality would not be affected by the operation of the reactors in a tritium-producing mode.

11.11 The commentor, referring to a statement made in the CLWR Draft EIS that, "Operational impacts on threatened or endangered species could occur through the release of thermal, chemical, or radioactive

discharges to the atmosphere or the river," asks why it is necessary to discharge radioactive materials into the river and whether there is an alternative.

Comment Summarized: 602-1

Response: The statement the commentor refers to is a general statement that thermal, chemical, or radioactive discharges potentially could occur. Further on in the text, the CLWR EIS states that the impact of such radiological releases should not have a detrimental effect on endangered species. Modern nuclear plants, however, do discharge some extremely small amounts of thermal, chemical, and radioactive materials during normal operations. This is because trace amounts of these materials find their way into the makeup water that feeds into and out of the reactor coolant system. When the coolant water leaves the reactor, it is piped into large "hold-up" tanks. Most of the water is recycled back into the reactor; but when the hold-up tank fills, the water is sampled and tested to make sure it is within the regulated radiological limits, and then discharged to the river. Such discharges are regulated by the NRC and by state environmental protection agencies. The state agencies issue NPDES permits that allow the plants to discharge certain chemicals and radiological constituents within legally specified limits. There are limits on how much of these materials a plant can discharge and when it can discharge them. The analyses presented in the CLWR EIS show that the incremental risk associated with such normal discharges would be very small. Even if a plant's safety systems failed and all the tritium released to the reactor coolant system during normal operation were discharged into the river, the resulting radiological doses would be small. [In estimating the radiological doses and risks to the public from such a tritium release, the CLWR EIS assumed the public was drinking water directly from the river, eating fish from the river, and swimming in the river.] Radiation dose limits for protecting human health are much lower than any dose that would be expected to have any adverse effects on other organisms. For this reason, such radiological releases should not affect endangered species or any other wildlife that includes the river as part of its habitat.

11.12 The commentor asks whether the small amounts of radiological and chemical materials normally discharged into a river by a nuclear power plant are processed before being discharged.

Comment Summarized: 602-2

Response: The liquid discharges from a nuclear plant are processed prior to release via controlled pathway to the river to reduce the quantities of radiological and chemical materials to well below the acceptable level established by the Federal and state regulatory authorities. However, it should be noted that this processing does not reduce the quantity of tritium before it is released to the environment. Tritium concentrations are monitored to ensure compliance with limits established by the NRC.

11.13 In response to an inquiry by another commentor regarding meteorological data collection, the commentor states that a device that measures wind velocities to gather data on prevailing winds in the region near the Watts Bar site already is available at the plant.

Comment Summarized: 701-2

Response: Each nuclear plant site is required to maintain an operable meteorological tower to supply weather information as needed to direct survey operations during a radiological emergency. From these and other facilities, TVA has accumulated detailed, thorough sets of meteorological data at each site, which were used in analyzing environmental impacts for air pathway pollutant releases in this EIS. Volume 1, Section 4.2.1.3 of the CLWR EIS describes the meteorology and climatology in the region of the Watts Bar site, including the prevailing winds, which are from the south-southwest.

CATEGORY 12: ECOLOGICAL RESOURCES

12.01 The commentor is concerned that TVA is divesting some of its recreational properties, such as the Land Between the Lakes, and putting so much energy into this project. The commentor would like TVA to keep that project and maybe turn it over to the Wildlife Resources Agency or some other agency to maintain. The commentor expresses a belief that it is not fair to take land from private citizens for TVA uses and then just dump it to some other agency; the land should go back to the people or some other appropriate community use.

Comment Summarized: 707-10

Response: TVA received appropriated funding to continue to manage the Land Between The Lakes in Fiscal Year 1999 as a National Recreation Area. TVA is committed to continue operating this area to provide outdoor recreation and environmental education opportunities for the American people. For more information concerning this project, the commentor is encouraged to call 1-800-525-7077.

12.02 The commentor states agreement with the information presented in the CLWR Draft EIS that there would be only a minimal impact on the Guntersville Reservoir—less than 0.2 percent of the flow—and only minor impacts to other aquatic resources.

Comment Summarized: 627-2

Response: Impacts to Guntersville Reservoir from the production of tritium at Bellefonte are discussed in Volume 1, Section 5.2.3.4 of the CLWR EIS; impacts to aquatic resources are discussed in Section 5.2.3.6.

12.03 The commentor expresses concern that ecosystem and economical considerations were not thoroughly examined and that activities such as diversions of water and dam construction have affected the viability of aquatic wildlife. The commentor asks what is to be gained environmentally and economically by choosing a CLWR for tritium production.

Comment Summarized: 116-11

Response: The CLWR EIS summarizes the existing ecological environment at each of the three CLWR sites. These discussions may be found in Volume 1, Sections 4.2.1.6 (Watts Bar Nuclear Plant Unit 1), 4.2.2.6 (Sequoyah Nuclear Plant Units 1 and 2), and 4.2.3.6 (Bellefonte Nuclear Plant Units 1 and 2). The EIS further addresses the environmental consequences of the alternatives at each site in Sections 5.2.1.6, 5.2.2.6, and 5.2.3.6. DOE is confident that discussions presented in these sections adequately address ecological issues related to the proposed action. Impacts from water diversions and dam construction on the Tennessee River are beyond the scope of the present document. Economical benefits from the proposed action are addressed under the socioeconomic sections of Chapter 5.

12.04 The commentor cites a number of court cases and expresses concern that the CLWR EIS did not adequately address potential impacts to threatened and endangered species, especially the Indiana bat, and that DOE, although it notified the U.S. Fish and Wildlife Service, did not consult with that agency concerning threatened and endangered species.

Comment Summarized: 116-13

Response: The U.S. Fish and Wildlife Service has been consulted concerning potential threatened and endangered species that could occur at each CLWR site. Two letters were received (July 10, 1998, Lee Barclay, Field Supervisor, to Jon Loney, Manager, Environmental Management, TVA, [DOI 1998a] and

July 21, 1998, Larry E. Goldman, Field Supervisor, to Jon Loney, Manager Environmental Management, TVA [DOI 1998b]) providing information on threatened and endangered species that should be evaluated at the three proposed sites. On September 29, 1998 (letter from James H. Lee, Regional Environmental Officer, to Stephen Sohinki, Director, Commercial Light Water Reactor Project Office, DOE [DOI 1998c]), the U.S. Fish and Wildlife Service commented on the CLWR Draft EIS and noted that: "The Fish and Wildlife Service previously provided a current list of Federally threatened and endangered species [including the Indiana bat] which occur in the area. The CLWR EIS incorporated consideration of impacts to those species and concluded the operation would not adversely impact those species. The Fish and Wildlife Service does not anticipate adverse effects to listed species from the proposal." If TVA's operational monitoring program finds an adverse impact on any listed species, TVA will initiate further consultation with the U.S. Fish and Wildlife Service.

12.05 The commentor states that the EIS lacks site-specific ecological data and analysis concerning sensitive species. The commentor states that site-specific analysis should include the number of individuals of a species and how many will be killed or displaced by the proposed action.

Comment Summarized: 116-19

Response: DOE believes that the analyses of ecological resources, including sensitive species, provided in Volume 1, Sections 5.2.1.6, 5.2.2.6, and 5.2.3.6 of the CLWR EIS adequately address potential impacts from the proposed action at each of the three sites under consideration. Where the potential exists to affect ecological resources, the analyses demonstrate that impacts would be minor and/or of short duration. These results do not warrant the collection and analysis of detailed population data for each species potentially affected. The collection of detailed data and its analysis would only provide meaningful results if other than minor and/or short-term impacts were postulated. Council on Environmental Quality Regulations 1502.2 (a) and (b) state that EISs should be analytic rather than encyclopedic and that impacts should be discussed in proportion to their significance. The regulations go on to state, "There shall be only brief discussion of other than significant issues. As in finding of no significant impact, there should be only enough discussion to show why more study is not warranted."

With regard to sensitive species, the U.S. Fish and Wildlife Service, after reviewing the CLWR Draft EIS, found the analysis adequate to conclude that adverse impacts to listed species are not anticipated (letter dated September 29, 1998, James H. Lee, Regional Environmental Officer, to Stephen Sohinki, Director, Commercial Light Water Reactor Project Office [DOI 1998c]).

12.06 The commentor notes that Section 4.2.2.6, Aquatic Resources, mentions a decline in native mussel populations near the Sequoyah Nuclear Plant; but the reason for the decline was not addressed.

Comment Summarized: 146-6

Response: The referenced section states that few native mussels persist in the impounded portions of the Tennessee River adjacent to the Sequoyah Nuclear Plant site. The paragraph also states that mussels are present in the portions of the river below both the Chickamauga and Watts Bar Dams. While not directly stated, the intent of the paragraph is to point out that mussels do not occur in the impounded portions of the river and do occur in the more free-flowing portions of the river below the dams. Volume 1, Section 4.2.2.6 was revised in the CLWR Final EIS to clarify this point.

CATEGORY 13: SOCIOECONOMICS, ENVIRONMENTAL JUSTICE

13.01 The commentor states that people that live near Bellefonte are not educated enough to operate nuclear power plants and that bringing in employees to run the plant is not a good idea. Another commentor expresses concern that there is not enough housing for people to move into the area around Bellefonte.

Comments Summarized: 106-2, 200-1

Response: Approximately 800 people would be needed at Bellefonte for its efficient and safe operation. These 800 individuals would possess different skills and have various levels of education and training commensurate with their duties and responsibilities at the nuclear plant. Any individuals hired from the area or elsewhere to work at Bellefonte would be well trained in accordance with NRC requirements, applicable laws, good business practices, and nuclear industry guidelines. Internal and external audits, inspections, and assessments would ensure that these persons remain adequately trained to safely perform their jobs at the plant. While the initial economic effect of bringing in workers to operate Bellefonte may strain local infrastructure, the overall impact is expected to result in economic growth for the region.

Demand for housing by construction and operations workers in the vicinity of Bellefonte would increase during the completion and operation of the plant. Data indicate that vacant permanent housing for sale and rent in the vicinity of Bellefonte would not meet this demand. It is anticipated, however, that the completion and operation of Bellefonte would stimulate the construction of additional permanent housing, the opening of new trailer parks, and the expansion of existing parks to meet this demand. The construction of new housing units during the completion of Bellefonte would have a positive effect on the regional economy. It is expected that these new units also would meet permanent housing requirements for plant operations workers and their families. The impacts on housing from the completion and operation of Bellefonte are discussed in greater detail in Volume 1, Section 5.2.3.8 of the CLWR EIS.

13.02 The commentor asks the following question, "Since TVA has been planning on converting Bellefonte to a fossil fuel plant, how will the destruction of that plan affect the economics of the surrounding area?"

Comment Summarized: 116-12

Response: The economic impacts of converting Bellefonte to a fossil fuel plant are described in Section 4.2.12 of the *Final Environmental Impact Statement for the Bellefonte Conversion Project* (TVA 1997). As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. DOE believes that the CLWR EIS discusses all of the reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. Conversion of the Bellefonte plant to a fossil fuel electricity-generating plant would not accomplish DOE's purpose and need as stated in the CLWR EIS. As such, conversion of the Bellefonte plant to a fossil fuel plant is not a reasonable alternative for the CLWR EIS and, therefore, the comparison of tritium production with a fossil fuel plant is not presented in the CLWR EIS.

13.03 The commentor suggests that DOE avoids discussing in the CLWR EIS the economic impacts to recreation in general and, specifically, the Guntersville State Park and Reservoir. The EIS did not discuss the economics of fishing, hunting, hiking, wildflower viewing, bird watching, horseback riding or other recreational uses of these areas.

Comment Summarized: 116-22

Response: As the commentor points out, it is indeed true that the economic impacts to recreation are somewhat "intangible" and difficult to quantify. Impacts to recreation, however, may be evaluated by reviewing the number of fishing and boating licenses, for example, on other reservoirs with nuclear power plants experiencing similar conditions to that which would be experienced on the Guntersville Reservoir if the Bellefonte plant became operational.

TVA constructed and operates two nuclear power plants, Sequoyah and Watts Bar, on Chickamauga Reservoir near Chattanooga. TVA has seen no evidence of diminished recreational use on this reservoir due to the presence of these plants. Water-based recreation including fishing, boating, and water skiing is very popular on Chickamauga Reservoir. Other types of recreation, such as hunting and wildlife observation on adjoining lands, also are popular. Based on TVA's experience on Chickamauga Reservoir, there is no reason to believe that these recreational resources on Guntersville Reservoir would be impacted. The following information has been gathered in response to this comment.

There has been no decrease in fishing activities since Watts Bar went on line in May 1996.[1]

There were no appreciable changes in use patterns at TVA camping and park facilities in the area around Watts Bar. The Meigs County Arts and Crafts Festival has increased in size each year for the past several years.[2]

Creel survey data collected for Watts Bar before plant operations (1982-1985) and since the plant began operations (1996-1998) report that, since the plant began operations, harvest rates have exceeded those from before plant operations for all species compared.[3]

Tennessee Wildlife Resources Agency boat registration and hunting/fishing licenses sold in Meigs and Rhea counties are listed below. Hunting and fishing licenses are sold as a combined license. These data suggest that the startup of Watts Bar in 1996 had no effect on these common recreation outlets.

	1995	***1996***	***1997***
Hunting/Fishing Licenses[4]			
Meigs County	12,687	10,699	11,521
Rhea County	13,802	12,563	13,466
Boating Registration[5]			
Meigs County	927	NA	1,119
Rhea County	2,182	NA	2,435

13.04 The commentor suggests that the socioeconomic discussions in the EIS need to be at the same level of detail for each site.

Comment Summarized: 146-7

[1]Telephone interview with Tim Churchill, State of Tennessee Wildlife Resources Agency, Nashville, December 4, 1998.

[2]Telephone interview with Charlie Ellenburg, Tennessee Valley Authority Land Use Specialist, Melton Hill, December 4, 1998.

[3]Baxter, D.S., et al, *Aquatic Environmental Conditions in the Vicinity of Watts Bar Nuclear Plant During Two Years of Operation, 1996-1997* (Tennessee Valley Authority, Resource Group, Water Management, Norris, Tennessee, June 1998) 102.

[4]Telephone interview with Nellie Mann, State of Tennessee Wildlife Resources Agency, Nashville, December 7, 1998.

[5]Telephone interview with Becky Tomlin, State of Tennessee Wildlife Resources Agency, Nashville, December 7, 1998.

Response: Only the incremental socioeconomic impacts of tritium production were considered at the Watts Bar and Sequoyah Nuclear Power Plants. It was determined that the small regional costs and benefits associated with tritium production at these plants would have no measurable socioeconomic impacts. Less than 10 additional full-time equivalent workers would be required per unit. Because neither Bellefonte 1 nor Bellefonte 2 are currently operating, the EIS assessed the impacts of completing and operating these plants for tritium production. The socioeconomic impacts of this action at Bellefonte are far greater than at either Watts Bar or Sequoyah. The additional socioeconomic detail provided on Bellefonte in this instance is warranted, while additional socioeconomic detail on Watts Bar and Sequoyah is not necessary. This approach is consistent with Council on Environmental Quality Regulations 1502.2 (a) and (b). These regulations state that EISs should be analytic rather than encyclopedic, and that impacts should be discussed in proportion to their significance. These regulations also state, "There shall be only brief discussion of other than significant issues. As in finding of no significant impact, there should be only enough discussion to show why more study is not warranted."

13.05 Several commentors recommend that Bellefonte be selected by DOE as its primary tritium production source because it would create 800 permanent jobs and hundreds more indirect jobs, and this would have a significant economic impact on northeast Alabama because American workers would fill these jobs and retain them. However, one commentor also states that tritium production may not be the best way to create jobs. Other commentors state that the citizens of Jackson County would not receive the benefit of either short- or long-term jobs.

Comments Summarized: 232-1, 625-2, 627-3, 707-15, 806-3

Response: DOE acknowledges that there is both support for and opposition to the CLWR program and the selection of Bellefonte as the preferred tritium production site. The purpose of the CLWR EIS is to evaluate the environmental impacts of the reasonable CLWR alternatives for providing the tritium necessary to support the enduring stockpile as defined by the President in the Nuclear Weapons Stockpile Plan.

Tritium production at Bellefonte would have a significant economic impact on the region. These impacts are described in Volume 1, Section 5.2.3.8 of the CLWR EIS. Approximately 800 people would be needed at Bellefonte for its efficient and safe operation. These 800 individuals would possess different skills and have various levels of education and training commensurate with their duties and responsibilities at the nuclear plant. Local workers would be hired to the greatest extent possible which, as discussed in Section 5.2.3.8, would result in a lower unemployment rate, especially during construction. Any individuals hired from the area or elsewhere to work at Bellefonte would be well trained in accordance with NRC requirements, applicable laws, good business practices, and nuclear industry guidelines. Internal and external audits, inspections, and assessments would ensure that these persons remained adequately trained to safely perform their jobs at the plant. While the initial economic effect of bringing in workers to operate Bellefonte might strain local infrastructure, the overall impact would be expected to result in economic growth for the region.

13.06 A commentor expresses concern that there is no economic benefit [from tritium production at Bellefonte] to the residents of Scottsboro because local property values will be reduced, and local taxes will rise as a result of the completion of Bellefonte.

Comment Summarized: 232-4, 806-6

Response: As discussed in Volume 1, Section 5.2.3.8 of the CLWR EIS, DOE expects a positive socioeconomic impact associated with the completion of the Bellefonte plant. A significant number of new jobs would be added during construction and operation, along with significant new revenues and taxes to the local economy. Demand for housing would increase. It is speculative to expect property values to decrease as a result of completing Bellefonte.

13.07 A commentor asks whether the economic impact of using Watts Bar or Sequoyah for tritium production would be positive and negative. The commentor also asks that the welfare of the citizens of Rhea County be included in DOE's deliberations, and notes that Bellefonte would have greater and more positive economic impact.

Comment Summarized: 813-2

Response: As indicated in Volume 1, Sections 5.2.1.8 and 5.2.2.8 of the CLWR EIS, only the incremental socioeconomic impacts of tritium production were considered at Watts Bar and Sequoyah, which are operating nuclear power plants. It was determined that the small regional costs and benefits associated with tritium production at these plants would have no measurable socioeconomic impacts. Less than 10 additional full-time equivalent workers would be required per unit. The socioeconomic impacts, therefore, would not be noticeable. The socioeconomic impacts of completing Bellefonte would be far greater than those for either Watts Bar or Sequoyah. The socioeconomic impacts from tritium production at Watts Bar, described in Volume 1, Section 5.2.1.8 of the CLWR EIS, were determined based on the socioeconomic baseline conditions described for Rhea County in Section 4.2.1.8.

13.08 Several commentors express concern that DOE has not adequately determined whether minority and low-income populations living closest to the plants are experiencing disproportionate impacts and has not presented this information in the EIS. One commentor suggests that environmental impacts might be diluted by the usage of a 50-mile radius in the environmental justice analysis, when water and air contamination problems could be concentrated in areas of proximity to reactor sites.

Comments Summarized: 94-21, 137-10, 702-15

Response: DOE is committed to full compliance with all provisions of Executive Order 12898. The environmental justice analysis was prepared in compliance with the Council on Environmental Quality's guidelines for inclusion of environmental justice under NEPA. The CLWR EIS addresses the issue of whether implementation of the proposed action or alternatives would result in disproportionately high and adverse environmental effects on minority populations or low-income populations. The Council's guidance further states that an environmental effect must be significant to qualify as disproportionately high and adverse, where significant is defined by the Council's implementation regulations (see § 1508.27 and Volume 1, Appendix G, Section G.2 of this EIS). As discussed in Volume 1, Chapter 5 of the CLWR EIS, implementation of the alternatives for production of tritium in CLWRs would pose no significant radiological or nonradiological health risks to the public. The estimated incremental dose to an average individual from the production of tritium would be approximately one-ten-thousandth of the natural background radiation. The risks would not be significant regardless of the racial, ethnic, and economic composition of potentially affected populations.

As discussed in Volume 1, Chapter 5 and Appendix G of the CLWR EIS, implementation of the proposed action or alternatives would pose no significant risks to the entire population residing within 80 kilometers (50 miles) of candidate sites, or to maximally exposed individuals within 80 kilometers of the candidate sites. As shown in Figures G-1 through G-15 of Appendix G of the CLWR EIS, low-income populations reside throughout some of the potentially affected areas. However, implementation of the proposed action or alternatives would pose no significant risks to the potentially affected population regardless of the economic status of individuals that comprise the population.

Volume 1, Chapter 5 of the CLWR EIS describes radiological health impacts on the entire population residing within 50 miles of the candidate sites. Radiological health impacts are not diluted by selection of a 50-mile radius-of-effects zone, because the total population dose within the 50-mile distance is the sum of estimated doses received by each member of the potentially exposed population. For example, the total population dose described in Chapter 5 of the CLWR EIS is the sum of estimated doses to persons within 15 miles of the site

added to the sum of estimated doses to persons at a distance larger than 15 miles, but no more than 50 miles from the site. The 50-mile radius-of-effects zone is used because potential impacts due to air and water contamination would not be limited to the area immediately surrounding the candidate sites, nor would potentially affected minority and low-income populations necessarily be concentrated near the sites. Consequently, the environmental justice analysis described in Volume 1, Appendix G of the CLWR EIS considers minority populations and low-income populations residing throughout the potentially affected area.

Figures in Appendix G have been revised and new figures added showing the location of minority and low-income populations residing within 10 miles of the candidate sites. In addition, for each of the 16 principal directions, a representative average individual dose at 5 miles and 25 miles has been overlaid onto the 10-mile and 50-mile radii, respectively, to show the potential dose to minority and low-income populations.

CATEGORY 14: OCCUPATIONAL & PUBLIC HEALTH & SAFETY - NORMAL CONDITIONS

14.01 The commentor recommends that historical exposures to workers in similar processes, with administrative controls in place, be reviewed and the risks then extrapolated and included in Table 5-30.

Comment Summarized: 146-13

Response: Volume 1, Table 5-39 (formerly Table 5-30) is mainly intended to address the impacts of airborne trace releases of hazardous chemicals to the public and workers. These chemical compound releases are derived exclusively from processes and operations considered to be point sources and, therefore, are emitted through exhaust stacks above the level where they would affect workers in the immediate vicinity of the emission source. The vast majority of the chemicals are released from the auxiliary boilers and emergency diesel generators when operated to provide heat and backup power. These processes do not operate continuously. The emergency diesel generators, for example, operate only when being tested during inactive periods to ensure reliability or demanded upon loss of normal electrical power. Additional language has been added to the text in Volume 1, Section 5.2.3.9.1 of the CLWR EIS to clarify the nature of the emissions and the risk they pose to workers.

14.02 The commentor reports that, according to the International Geological Society and the National Geology Group, it is improper to use a 50-mile radius around each of the TVA plants for impact analyses in this particular region. The commentor believes the maximum meteorological impact assumed in the CLWR EIS is understated. The commentor suggests shaping these areas more like an oblong than a circle to account for the narrow corridor in which the prevailing winds move.

Comment Summarized: 703-10

Response: Chapter 5 of the CLWR EIS describes the radiological health impacts on the entire population residing within a 50-mile radius of the candidate sites. Radiological health impacts are not diluted by selection of a 50-mile radius-of-effects because the total population dose within the 50-mile distance is the sum of estimated doses received by each member of the potentially exposed population. For example, the total population dose described in Volume 1, Chapter 5 of the EIS is the sum of the estimated doses to persons within 15 miles of the site added to the sum of estimated doses to persons at a distance larger than 15 miles, but no more than 50 miles, from the site. The 50-mile radius-of-effects is used because potential impacts due to air and water contamination would not be limited to the area immediately surrounding the candidate sites. The meteorological data used in the calculations are discussed in Volume 1, Appendix C, Section C.3.2 of the CLWR EIS.

The meteorological data used to analyze radiological impacts under normal operations at each of the sites are in the form of joint frequency distribution files from each site. These data are representative of the historical meteorological conditions at the specific plants. A joint frequency distribution is a table listing the fractions of time the wind blows in a certain direction, at a certain speed, and within a certain atmospheric stability class. Contributions to dose from other TVA plants along the Tennessee River Valley are considered in the doses to the general public shown in Volume 1, Tables 4-9, 4-21, and 4-37. These doses are used in the assessment of cumulative impacts in Volume 1, Section 5.3.2 of the CLWR EIS. The dose contribution from other nuclear plants along the Tennessee River to doses to the public in the vicinity of any one plant is a very small part of the overall dose.

DOE believes the 50-mile radius provides a valid basis for assessing CLWR impacts and for comparing alternatives considered in the CLWR EIS.

14.03 The commentor asks whether DOE's analyses of the impacts of tritium production on the affected environment are based on current prevailing winds. The commentor points out that, according to the National Weather Service, 90 percent of the prevailing winds in the local area come straight up from Alabama to the [Tennessee] state line and do not expand widely. The commentor states that the graphics in the CLWR EIS used to illustrate the area should be corrected because the lines run 50 miles in any one direction and do not reflect the national average for these valleys.

Comment Summarized: 703-8

Response: The meteorological data used to analyze the radiological impacts of normal operations at each of the sites are in the form of joint frequency distributions from each site. These data are representative of the historical meteorological conditions at the specific plants. These data are considered to be more representative of dispersion conditions at these sites than data taken from more remote meteorological stations operated by the National Oceanographic and Atmospheric Administration. A joint frequency distribution is a table listing the fractions of time the wind blows in a certain direction, at a certain speed, and within a certain atmospheric stability class. Contributions to dose from other TVA plants along the Tennessee River Valley are considered in the background doses to the general public shown in Volume 1, Tables 4-9, 4-21, and 4-37. These background doses are used in the assessment of cumulative impacts in Volume 1, Section 5.3 of the CLWR EIS. The dose contribution from other nuclear plants along the Tennessee River to doses to the public in the vicinity of any one plant is a very small part of the overall dose.

14.04 Several commentors express opposition to the proposed action because of concerns about safety, cancer incidence, health problems and other harmful effects on people, and environmental pollution to air and water. One of the commentors expresses opposition to both CLWR and accelerator production of tritium.

Comments Summarized: 11-2, 12-2, 13-1, 17-2, 30-1, 33-2, 39-1, 48-3, 51-2, 52-2, 53-4, 80-1, 84-2, 99-5, 100-1, 105-1, 106-1, 108-1, 109-3, 112-3, 113-2, 115-2, 116-26, 122-2, 132-1, 136-10, 138-2, 208-1, 212-6, 213-2, 241-2, 610-5, 712-2, 811-5, 815-4, 818-2

Response: The radiological releases to the environment that could result from the proposed action under normal operating conditions and various hypothetical accident scenarios are conservatively estimated in Volume 1, Chapter 5 of the CLWR EIS for each candidate reactor site. The potential impacts to the environment and the radiological doses and risks to the public from these releases are assessed and discussed in Chapter 5. The assumptions and methodology used for the assessment are described in detail in Volume 1, Appendix C and D of the CLWR EIS for normal operation and accident conditions, respectively. The methodology used is based on scientific standards accepted in the nuclear industry and dictated by Federal and state regulatory authorities. As discussed in Chapter 5 of the EIS, the environmental impacts and the potential radiological doses to the public are well within the limits considered acceptable by the regulatory authorities.

Before tritium is produced at any of the reactor sites considered in this EIS, the NRC will review all aspects of the design and operation of the plant(s) related to tritium production. The NRC will then issue a license amendment only upon finding that the operation is not expected to endanger the health and safety of the public. The commentor's additional opposition to the accelerator production of tritium is noted.

14.05 One commentor refers to tables and sections in the CLWR Draft EIS where tritium releases and resulting potential exposures with and without TPBARs are presented. The commentor suggests that the EIS highlight the fact that releases of tritium to the air and water at Watts Bar and Sequoyah, as well as radiological doses from normal operation and potential accidents, would be multiple times those of operation without TPBARs. The commentor suggests that this is not immediately apparent in the tables in the CLWR Draft EIS and is important in light of the fact that DOE, in previous meetings, assured the public that the TPBARs were virtually leakproof.

Comments Summarized: 94-25, 702-10, 825-2

Response: DOE maintains that the performance of the "getter" is such that there is virtually no tritium in the TPBARs available in a form that could permeate through the TPBAR cladding. In assessing the potential release of tritium, the CLWR EIS assumes that annually about 1 Curie of tritium could permeate through a TPBAR cladding and be released to the environment; and that two TPBARs fail in each core load of TPBARs and release their entire tritium inventory to the reactor coolant and then to the environment. As discussed in the CLWR Draft EIS, these assumptions are extremely conservative, but they were made to provide a bounding estimate for environmental and human health effect analyses. Because of the relatively low actual radioactive releases at both Watts Bar and Sequoyah reported in Chapter 4 of the CLWR Draft EIS, the ratio of the conservatively estimated releases and doses with tritium production to the actual releases and doses without tritium production tends to be exaggerated. Even with the conservative assumptions, the incremental tritium production doses estimated in the CLWR EIS are a small fraction of those resulting from natural background radiation.

It should be noted that the assumption of two TPBAR failures has been modified in the CLWR Final EIS. As discussed in Volume 1, Section 1.9 of the CLWR Final EIS, in light of Westinghouse data concerning the historic failure rate of standard burnable absorber rods, the CLWR Final EIS still evaluates the failure of the two TPBARs, but this event is now categorized as "abnormal" and not part of normal operations. Consequently many of the numbers referred by the commentor have been changed in the CLWR Final EIS.

14.06 One commentor who reviewed the CLWR Draft EIS on behalf of the U.S. Public Health Service, Department of Health and Human Services, concludes the risks to the public health from the operation, transportation, and accident scenarios expressed by the CLWR Draft EIS are low and reasonable expectations from the operation of CLWRs. The U.S. Department of the Interior and U.S. Fish and Wildlife Service also reviewed the CLWR Draft EIS and concludes that tritium production would not adversely impact Federally threatened and endangered species. The draft also was reviewed by the Tennessee Department of Environmental Compliance, which concludes that the proposed action does not compromise the health and safety of the citizens in Tennessee. The Tennessee State Historic Preservation Office comments that the proposed action will have no impact on the National Register of Historic Places listed or eligible properties.

Comments Summarized: 101-1, 126-1, 142-1, 145-1

Response: The reviews of the CLWR Draft EIS by the U.S. Department of Health and Human Services, U.S. Department of the Interior, the Tennessee Department of Environmental Compliance, and the Tennessee State Historic Preservation Office are appreciated, and the conclusions presented by the commentors are noted.

14.07 The commentor, referring to a statement made on page 25 of the Summary of the CLWR Draft EIS that Watts Bar radiation exposure within 50 miles is 0.55 person-rem per year, asks how the value was derived.

Comment Summarized: 22-1

Response: Volume 1, Table 5-4 (formerly Table 5-3) of the CLWR EIS, Section 5.2.1.9.1, provides the data presented in the CLWR EIS Summary. Note "a" in Table 5-4 has been revised to read that the 1997 measurements and the associated population dose estimates were adjusted for estimated changes in the population for the year 2025.

14.08 Although agreeing with the radiation exposures to the workers and the public estimated in the CLWR Draft EIS, the commentor notes that the CLWR Draft EIS does not adequately address the fact that the commercial reactor industry does not possess the infrastructure and experience to deal with the magnitude of tritium contamination and exposures. The commentor suggests that the cost for building this infrastructure for radiation protection be folded into the cost assessment for producing tritium in a CLWR.

Comment Summarized: 31-1

Response: The commercial reactor industry has the infrastructure and experience to handle the postulated incremental increase in radiation exposure to workers due to tritium production. Reactor coolant radioactivity levels including tritium are routinely monitored, and corrective actions are taken to reduce the activity levels when required. No additional monitoring or sampling points requirements in the reactor coolant system and plant effluent streams have been identified as a result of tritium production. With the exception of TPBAR handling, TPBAR storage, transportation cask handling, and transportation cask shipping procedures, no new procedures have been identified as a result of tritium production. The projected additional costs were considered by TVA and were incorporated into their proposal to DOE. In the unlikely event that high activity levels are attributable to tritium production upset conditions, existing procedures would be used to reduce the level of tritium contamination in the reactor coolant system.

14.09 The commentor opines that the potential impact on workers involved in fuel operations should be evaluated, since it is likely that air-supplied plastic suits may be needed for their protection due to increased tritium oxide levels in the air above the refueling water canal and fuel storage pool. Adequacy of air supply, the need for communication systems, and the potential for increased chance of error all need to be included in the evaluation. The commentor also states the CLWR Draft EIS does not mention the role of the refueling water storage tank in the holdup of tritium as a liquid waste. This applies to all of the reactor options. If not vented or disposed of, the tritium in this tank and (subsequently) in the refueling water can increase with each refueling and would require personnel to wear air-supplied plastic suits for protection during this operation. This would be an impediment in refueling operations.

Comment Summarized: 41-9

Response: As discussed in Volume 1, Chapter 5 of the CLWR EIS, the analyses estimating the dose to the public postulated that all tritium added to the reactor coolant system as a result of tritium production would be released to the environment during the operating cycle (10 percent via air pathways and 90 percent via water pathways). The analyses did not credit the holdup and buildup of tritium in the reactor coolant to reduce plant emissions. Worker dose was calculated based on the tritium concentration in the reactor coolant system resulting from conservative assumptions regarding tritium permeation/leakages from the TPBARs. These calculations concluded that the tritium concentration in neither the reactor coolant system nor the refueling/spent fuel pool would reach a limit requiring the use of special protective gear to perform activities in the refueling area. The tritium concentration in the reactor coolant system would be maintained at an acceptable limit through the use of a reactor coolant water treatment system that maintains the coolant activity

levels within operational limits and allows a portion of the treated volume to be released to the environment via controlled water pathways. The refueling water storage tank was not considered for the holdup of tritium as a liquid waste. When the reactor is shut down, the water in this tank is used to fill the reactor cavity during the refueling operation. The tank is refilled with this water, which could contain some level of tritium contamination. The tank is vented to the atmosphere, but no detectable concentration of tritium escapes through this route. Therefore, there will be no impact on the workers.

14.10 The commentor, referring to Section 4.2.2.4 of the CLWR Draft EIS, states that a significant source of tritium release to the river can occur if the reactor continues to operate with primary to secondary leakage and the cooling tower is bypassed. Alternately, a significant increase of airborne tritium oxide would occur if the cooling tower were in full use. This is an important distinction that needs to be made when evaluating the radiation impact on persons both on and off site. The commentor suggests that a projected use pattern should be incorporated into projected dose calculations based on past meteorological data and the projected power level of the reactor. Projected estimates of tritium concentration should be made at each of the drinking water supply intakes downstream of the site, based on cooling tower use and the projected buildup of tritium in Chickamauga Lake during various net flows.

The commentor also points out that Table 4-21 lists the sources of background radiation exposure to individuals in the vicinity of the Sequoyah site. In reality, the table lists the average exposure to the U.S. population from these sources and not the actual "measured" levels at the site. The commentor suggests that this point be clarified to avoid being misleading.

The commentor further points out that there are eight municipal water supplies downstream from the Bellefonte site, and suggests that a similar analysis should be made of the projected tritium concentration at each intake based on cooling tower usage, river flow, dam holdup, and meteorological conditions, as suggested for the Sequoyah site.

Comment Summarized: 41-12

Response: Primary to secondary leakage will not result in a direct pathway to the river or the air via the cooling tower. There is a potential for a direct pathway to the air if there is a sudden major drop of turbine load and the secondary side safety valves or atmospheric dump valves are actuated. This off-normal mode of operation could release some of the steam generator steam to the atmosphere. This effect was taken into consideration when the EIS conservatively assumed that all tritium released to the reactor coolant by the TPBARs would be released to the environment during normal operation. The EIS took no credit for the holdup or retention of tritium in the reactor coolant during sequential reactor operating cycles to reduce the effects of radioactive effluents on workers and on the general public. In accordance with NRC guidance for effluent releases, 10 percent of the tritium was assumed to be released via air pathways and 90 percent via water pathways. The dose estimates were based on past meteorological data and the reactor operating at 100 percent power.

The projected estimates of the tritium concentration at downstream drinking water supply intakes have been included in the revised Volume 1, Sections 5.2.1.4, 5.2.2.4, and 5.2.3.4 of the CLWR Final EIS.

The data presented in Volume 1, Table 4-21 reflect the average exposure to the U.S. population from the sources indicated. Notes have been added to Volume 1, Tables 4-9, 4-21, and 4-37 of the CLWR Final EIS to provide clarification.

14.11 The commentor states that the definition of "measurable health effects" was not included in the CLWR Draft EIS.

Comment Summarized: 86-2

Response: The term was used at the public meetings by DOE to characterize the results included in Chapter 5. The term "measurable health effects" does not appear in the CLWR Draft EIS. A measurable health effect is assumed to be a statistically measured health impact (i.e., risk of cancer incidence) resulting from the proposed operations. This impact is the estimated quantity above the normally occurring cancer mortality rate of 0.2 percent from all causes.

14.12 The commentor, referring to the terminology used in the CLWR Draft EIS for "affected environment," asks whether the term refers to "current prevailing winds."

Comment Summarized: 86-8

Response: The term "affected environment area" refers to the area within an 80-kilometer (50-mile) radius centered at the Watts Bar, Sequoyah, and Bellefonte reactor sites. Current prevailing wind patterns were used to estimate the potential environmental impacts on the affected environment area. The meteorological data used in the calculations are discussed in Volume 1, Appendix C, Section C.3.2 of the CLWR EIS.

14.13 The commentor suggests that Tables 3-9 and 3-16 of the CLWR Draft EIS include a breakdown of the isotopes that comprise the "other radionuclides" entry and the unidentified unit of measure in Table 3-9.

Comment Summarized: 94-19

Response: The breakdown of the isotopes identified as "other radionuclides" in Tables 3-5 and 3-9 of the CLWR Draft EIS have been added in Volume 1, Appendix C of the CLWR Final EIS as new Tables C-9 and C-10. Curies have been added as the unit of measure in the revised Table 3-9.

14.14 The commentor, referring to the limiting concentration of tritium in drinking water (20,000 picocuries per liter) in Table 5-24 of the CLWR Draft EIS, requests information on the meaning of the limit.

Comment Summarized: 116-14

Response: The EPA drinking water regulation tritium limit of 20,000 picocuries per liter, issued on July 9, 1976, was derived on the basis that the annual dose equivalent to the total body or any internal organ shall not be greater than 4 millirem per year. The 4 millirem dose was estimated based on a total water intake of 3 liters per day—2 liters per day by fluid intake and the balance by food and food oxidation. The dose conversion factors used as the basis for the 20,000 picocuries per liter limit have been refined since the limit was issued. Using current methodology and dose conversion factors, the dose estimate is reduced by approximately a factor of four. Using the conservative methodology presented in Volume 1, Section C.2.1.2 of the CLWR EIS to estimate health effects on an individual receiving a 4-millirem dose per year, the individual was estimated to have a 2.0×10^{-6} increased likelihood of cancer fatality per year.

14.15 The commentor expresses the opinion that the production of tritium at the Sequoyah and/or Watts Bar and/or Bellefonte Nuclear Plants as described in the CLWR Draft EIS does not appear to create a significant risk to the environment or human health, provided the tritium production is at a level that allows efficient power production. Less efficient power production would result in additional spent nuclear fuel and associated environmental and transportation risks.

Comments Summarized: 126-2, 127-1

Response: The primary mission of the Watts Bar and Sequoyah Plants is the generation of electricity. Production of tritium at these facilities is a potential secondary mission and would be based on agreements between TVA and DOE; it would not degrade the ability of these facilities to generate electricity. If no more than 2,000 TPBARs are irradiated in a reactor, no additional spent fuel would be generated. The generated spent fuel would be stored on site. Volume 1, Sections 5.2.1.12, 5.2.2.12, and 5.2.3.12, discuss the spent nuclear fuel management at each site, and Section 5.2.6 discusses the environmental impacts from the construction and operation of a generic ISFSI should one be needed. If Bellefonte is completed, the primary mission for this facility will be tritium production and the secondary mission will be generation of electricity. Based on agreements between TVA and DOE, the nominal 18-month operating cycle can be reduced to meet tritium production requirements. The operating power level would not be altered for tritium production. As stated under the Preferred Alternative in Volume 1, Section 3.2.7 of the CLWR Final EIS, DOE and TVA would minimize, to the extent practicable, the generation of additional spent nuclear fuel.

14.16 The commentor, while agreeing that the doses from tritium releases would be within Federal guidelines, suggests that the presentation in the CLWR Draft EIS implies that the increase in the quantity of tritium released is not significant. The commentor refers to numbers and sections in the CLWR Draft EIS where tritium releases with and without tritium-producing rods are compared.

Comment Summarized: 128-2

Response: The additional release of tritium as a result of tritium production at each potential reactor site is presented in Volume 1, Chapter 5 of the CLWR Draft EIS under "Air Quality" and "Water Resources." The estimated releases were based on the assumptions that 1 Curie of tritium per TPBAR per year could permeate through the cladding during irradiation and that two TPBARs could fail and release the entire inventory of tritium into the reactor coolant and eventually to the environment. These assumptions are very conservative and were used to provide a bounding estimate for the environmental analyses. The CLWR Draft EIS provided an assessment of the significance of these releases by estimating the resulting health and safety effects to the public and workers. While the TPBARs are not expected to fail during reactor operation, a failure rate of two TPBARs per cycle was chosen in the CLWR Draft EIS for conservatism. However, as discussed in Volume 1, Section 1.9, the CLWR Final EIS has been changed to reflect recent Westinghouse data on the failure rate of burnable absorber rods, which have characteristics similar to TPBARs. The CLWR Final EIS still evaluates the failure of two TPBARs per cycle as an abnormal event and not normal operation. As a result, the numbers quoted by the commentor have been changed in the CLWR Final EIS.

14.17 The commentor, referring to Section 5.2.7 of the CLWR Draft EIS notes that the text states that the environmental impacts from increasing the enriched uranium use in the reactor "would be minimal." The commentor asks how this compares with the tritium in liquid/air releases. The commentor also asks DOE to quantify the statement.

Comment Summarized: 143-8

Response: The basis for estimating radioactive releases during normal operation and potential accident conditions is the generation of fission products in the core during the operation of the reactor. As stated in Volume 1, Appendix A, Section A.3.1, tritium production would require an increase in fuel enrichment to just under 5 percent from the approximately 4.2 to 4.5 percent used currently (less than the licensing limit of 5 percent). The somewhat higher enrichments and reduced fuel assembly burnups associated with the tritium production core, as compared to the conventional core designs, can influence the radiological source term used in the calculation of radiological emissions other than tritium during normal operation and accident conditions. The *Tritium Production Core Topical Report* (WEC 1998) quantified the effect and concluded that, overall, the fission product inventories were the same or lower in the tritium-producing core. Therefore, the analysis presented in the CLWR EIS, which does not account for the increased enrichment, is conservative.

Tritium releases from TPBARs to the air or the water are independent of the fuel enrichment used.

14.18 The commentor refers to Section 4.2.1.9 of the CLWR Draft EIS where it states that conservative assumptions are used for both individual and population exposure times. The commentor recommends these conservative assumptions be expressly discussed in the CLWR Final EIS.

Comment Summarized: 146-3

Response: The exposure-time assumptions presented in Volume 1, Section 4.2.1.9 are cited directly from the *Annual Radiological Environmental Operating Report, Watts Bar Nuclear Plant 1997*, (TVA 1998b). Exposure-time assumptions associated with the health impact analyses for the alternatives presented in the EIS, however, are discussed in Volume 1, Appendix C, Section C.3.2 of the CLWR EIS.

14.19 The commentor, referring to Table 5-46 of the CLWR Draft EIS, notes that the assumption of one-month refueling is optimistic and recommends that an average refueling outage duration be used.

Comment Summarized: 146-21

Response: The one-month refueling assumed in the CLWR EIS is based on TVA experience at Watts Bar and Sequoyah.

14.20 The commentor notes that the health risks and impacts analyses in the CLWR Draft EIS deal with tritium production only, and not the risks and impacts of the plant itself (without tritium production). The commentor asks to know the health risks and impacts resulting from both tritium and nuclear power production. The commentor is concerned that people already are affected by nuclear power production and an additional 1.1 percent, or about 1,500 people, would die of cancer as a result of the proposed action.

Comment Summarized: 600-3

Response: As stated in Volume 1, Section 3.2.1 of the CLWR EIS, for the currently operating reactors (Watts Bar 1 and Sequoyah 1 and 2), the EIS assesses the incremental environmental impacts of tritium production at the reactors. This information is presented in Volume 1, Sections 5.2.1 and 5.2.2. The CLWR EIS addresses the impacts from the existing operation of these reactors under the No Action alternative and reports the total sum of the impacts in Volume 1, Section 5.3 of the CLWR EIS under Cumulative Impacts. The environmental impacts from the proposed action at Bellefonte, discussed in Section 5.2.3, include the impacts from the completion and the operation of the plant as a tritium-producing plant.

With respect to the commentor's assertion that an additional 1.1 percent, or about 1,500 people, would die of cancer as a result of the proposed action, the commentor is referred to Volume 1, Appendix C, Section C.2.1.2, where the CLWR EIS presents examples of how health effect risk factors are used and how latent cancer fatalities are calculated. One of the examples explains the calculation of latent cancer fatalities among people exposed to the natural background radiation of 300 millirem per year over a lifetime of 72 years. The proposed action will not result in the death of 1,500 people, and the resulting 1.1 percent risk is clearly not a risk resulting from the proposed action.

14.21 The commentor asks if his chances of winning the Georgia Lottery without buying a ticket are better than his chances of dying from radiation released by a tritium-producing Bellefonte Nuclear Plant.

Comment Summarized: 601-1

Response: The commentor's chances of receiving a fatal exposure to radiation produced by a completed, tritium-producing Bellefonte Nuclear Plant are equal to 1.6×10^{-7} per year or less than one in 6 million years (see Table 5-34 of the CLWR EIS). The commentor's chances of winning the Georgia lottery without buying a ticket are zero. The likelihood would be much higher that the commentor would die from causes other than radiation exposures resulting from tritium releases during Bellefonte operation. For example, an individual's chances of dying from cancer caused by natural background radiation (which is independent of the Bellefonte operation) over a 72-year lifetime are about 1.1 percent, or about 1,000 times more than that caused by Bellefonte operation.

14.22 The commentor states that the radiation exposure for residents of Jackson County, including background radiation and radiation from the Bellefonte reactor operations, would be 355.26 millirem per year, a lower dose than the average for U.S. citizens overall, which is 363 millirem per year.

Comment Summarized: 627-4

Response: As stated in the revised Volume 1, Appendix C, Section C.2.1.1 of the CLWR EIS, the average American receives a total of approximately 364 millirem per year from all sources of radiation, of which approximately 300 millirem is from natural background radiation and the rest from manmade sources. The commentor's statement is correct, but it should be noted that the background dose numbers are approximate and that the uncertainty associated with the approximation could be much larger than the 0.28 millirem per year contribution estimated in Volume 1, Section 5.2.3.9.1 of the CLWR EIS.

14.23 The commentor thinks the DOE presentation failed to sufficiently emphasize the high radioactivity of tritium.

Comment Summarized: 704-3

Response: Throughout the CLWR EIS, the health effects of tritium production on workers and members of the public have been analyzed. The analyses considered normal incident-free operation, plant upset events (i.e., abnormal occurrences), and a spectrum of accident scenarios. Tritium exists in the environment in two forms, elemental tritium and oxidized tritium. Of the two forms of tritium, oxidized tritium has a much more significant potential impact on human health. All analyses of tritium releases assumed that the tritium released would be in oxide form. In addition, Volume 1, Appendix C, Section C.2.2 of the CLWR EIS, summarizes the characteristics and biological properties of tritium. The CLWR EIS clearly identifies the impact of radiological releases due to tritium production on workers, the public, and the environment.

14.24 The commentor believes the cancer fatalities listed under environmental impacts in the EIS are exceedingly low and inaccurate, if recent newspaper stories are true.

Comment Summarized: 707-17

Response: The cancer fatality estimates presented in the CLWR EIS were made using accepted methods and data for estimating health impacts and industry-approved methodology, data bases, and computer analysis codes. Analysis results presented in this EIS have been reviewed for technical adequacy and accuracy. DOE cannot comment on the technical adequacy and accuracy of information published in newspapers.

14.25 A commentor expresses concern that low levels of tritium have been found in soil and water, and that DOE has said there is no easy way to treat it. The commentor further feels that DOE's position that a single dose or short-term exposure is not hazardous leads people to believe tritium is not dangerous. The commentor provides several examples of health effects from exposure to unspecified materials, and concludes that TVA and DOE are bringing nuclear thalidomide to the community.

Comments Summarized: 241-3, 811-6

Response: The environmental and biological behavior of tritium, as well as its health effects, are well understood and were the basis of the impact analyses presented in this EIS. The CLWR EIS provides a detailed analysis of the potential health effects from tritium production in Volume 1, Chapter 5 of the CLWR EIS. Conservative assumptions were used in those analyses as indicated in Volume 1, Appendix C of the CLWR EIS. In determining health effects, DOE treats all doses as having potentially adverse affects. The research studies indicated by the commentor do not concur with the results described in this EIS. Appendix C also includes studies on the health impacts of exposure to tritium.

CATEGORY 15: OCCUPATIONAL & PUBLIC HEALTH & SAFETY--ACCIDENT CONDITIONS

15.01 The commentor states that insurance companies do not cover any losses resulting from any type of nuclear power plant accident and asks if TVA and DOE would provide 100 percent of the cost of replacement for any losses suffered by the residents of Jackson County that are related to tritium production. The commentor suggests that, if the people of Jackson County are going to have tritium production at Bellefonte, maybe 100 percent coverage should be part of the plan—because they would be taking a risk in addition to receiving some advantages. The commentor asks for the name of an expert on Price-Anderson coverage.

Comments Summarized: 86-12, 623-3, 703-12

Response: The Price Anderson Act requires TVA, like all other owners of nuclear plants in the United States, to carry nuclear liability insurance. This insurance provides coverage for personal injury or property damage as a result of a nuclear accident. Under the current Price Anderson Act there would be over $9.5 billion available to pay claims. In *Resources Available for Nuclear Power Plant Emergencies Under the Price-Anderson Act and the Robert T. Stafford Disaster Relief and Emergency Assistance Act* (NUREG 1457) (NRC 1992), some examples of the type of assistance that is available under the Price Anderson Act are provided. NUREG 1457 states, for property that is deemed uninhabitable as a result of a nuclear accident, the insurer will reimburse for present real estate value, based on a pre-accident assessment. Information on the Price-Anderson Act may be obtained at: American Nuclear Insurers, Town Center, Suite 300S, 29 South Main Street, West Hartford, Connecticut, 06107-2430.

15.02 The commentor expresses opposition to use of the unfinished Bellefonte plant or any other commercial nuclear reactor for the production of tritium. The commentor regards this as a dangerous and highly undesirable course of action for several reasons. These include the effects of tritium on the human body and its DNA, DOE's history of tritium-releasing accidents at its other production facilities, the implication for accidental tritium releases from Bellefonte, and the effects of the resulting radioactive contamination of the Tennessee River water supply. The commentor suggests that such accidents are more likely to occur at a facility that is not designed for tritium production.

Comment Summarized: 25-1

Response: The commentor's opposition to the use of Bellefonte for tritium production is noted. The CLWR EIS analyzes the potential water quality impacts associated with the operation of Bellefonte 1 or Bellefonte 1 and 2 for tritium production. In analyzing the impacts to the health and safety of the public, the EIS takes into consideration the radiological and biological characteristics of tritium as discussed in Appendix C, Section C.2.2 of the CLWR EIS. The results of these analyses are presented in Volume 1, Sections 5.2.3.4 and 5.2.3.9. TVA, which would be the licensed operator of the Bellefonte Nuclear Plant, possesses a permit from

the NRC to construct two nuclear power generation units at the Bellefonte site. As part of the construction permit approval process, the NRC reviewed the design of the two units and the projected chemical and radiological releases to the environment during normal operation, postulated operational upset events, and accidents. Operation of nuclear power generation units at the Bellefonte site and associated operational and accidental releases would be within the limits established by the NRC as the licensing basis for the safe operation of the Bellefonte Nuclear Plant. DOE has made environment, safety, and health considerations paramount in all operations at DOE sites through the use of internal and external regulations, appropriate controls in contracts, and day-to-day management and oversight of nuclear operations. DOE is confident that TVA is capable of safely operating the Bellefonte reactors. Although the Bellefonte reactors were not designed specifically to produce tritium, they can easily accommodate TPBARs. There is a very small increase in reactor accident consequences due to the irradiation of TPBARs at Bellefonte, as discussed in Volume 1, Section 5.2.3.9.2.

15.03 Several commentors oppose the implementation of the proposed action because of concerns about potential accidents. One commentor asserts that, since all of the DOE's former tritium production plants have had accidents resulting in leaks into the environment, there is no doubt that commercial reactors inherently unsuited for weapons production will leak and destroy the Tennessee River, the Tennessee Valley, and peoples' lives. The commentor also asserts that tritium can cause cancers, genetic mutations, and problems in unborn babies, and that there is no safe dose. Other commentors state that accidents would undoubtedly occur that could ruin the state, or that a chance of an accident occurring would be too risky considering the magnitude of a nuclear disaster.

Comments Summarized: 13-2, 80-3, 138-1, 252-2

Response: As discussed in Volume 1, Chapter 5 of the CLWR EIS, the environmental impacts and potential doses to the public from the proposed action are well within the standards adopted by the regulatory authorities. Sections 5.2.1.9.2, 5.2.2.9.2, and 5.2.3.9.2 of the CLWR EIS provide the results of the analyses of the incremental risk resulting from hypothetical accident scenarios during tritium production at CLWRs. These analyses are performed using generally accepted methods for design-basis and beyond design-basis accident analyses in support of the reactor operations promulgated by the NRC. The analyses used special models for the evaluation of consequences of accidental releases of tritium (tritiated water vapor) to the environment. Volume 1, Appendix C, Section C.2.2 of the CLWR EIS summarizes the characteristics and biological health effects of tritium. This appendix also provides the health effect standards used to estimate the potential lifetime cancer mortalities resulting from exposure to tritium and other radioactive materials. These health effects were calculated using a linear extrapolation from the nominal risk estimated for lifetime total cancer mortality at a dose of 10 rad to a very low dose level (i.e., zero dose). The impacts from the application of this model are considered to be an upper bound estimate. There is scientific uncertainty about the cancer risk in the low dose region below the range of epidemiological observation, and the possibility of no risk, or even a health benefit, cannot be excluded. The low dose region is defined as a dose level (~0.01 rad) where DNA repair can occur in a short period (a few hours) after irradiation-induced damage.

As explained in Volume 1, Section 3.1.1 of the CLWR EIS, CLWRs are well suited to produce tritium because they require no elaborate and complex engineering and test programs. This conclusion is based on numerous studies, analyses, and tests performed as part of new production reactor efforts in the early 1990s. The results of the EIS accident analyses indicate that only very small impacts would occur for any of the credible accident scenarios for tritium production in a CLWR.

15.04 The commentor expresses the opinion that a new safety analysis will have to be performed to consider the potential increased internal pressure in the reactor vessel during a melt-down that could result from partial fusion of the large quantities of tritium in a degraded core with uncontrolled recriticality. Temperature data from the Three Mile Island accident should be used in the analysis.

The commentor further asserts that, although beyond design-basis accidents were analyzed, the analysis was done using the MACCS2 accident analysis computer code (SNL 1997) for a standard pressurized water reactor core. However, if a significant increase in energy can be released in the reactor vessel due to fusion of tritium gas in the core during a meltdown accompanied with uncontrolled recriticality, the code would not be useful for assessment of accident conditions. The commentor suggests that Table 5-49 in the CLWR Draft EIS also should list under the beyond design-basis accident an evaluation of energy release from possible fusion of tritium in the core, using the Three Mile Island temperature data in the event of a recriticality of the degraded core.

Comment Summarized: 41-3

Response: Analyses of tritium production reactors have shown that only reactor cores with an enrichment greater than 7.5 percent uranium-235 have the potential for uncontrolled recriticality during severe core melt accidents. Since all CLWRs operate with a core enrichment of less than 5 percent, recriticality is not an issue during core melt accident sequences. In addition, the temperature distribution following a severe core melt accident is insufficient to promote any fusion reaction involving tritium or lithium. A fusion reaction requires a "confinement medium" corresponding to temperatures on the orders of tens of millions of degrees, which is not possible in a reactor accident. The analyses presented in the CLWR EIS correctly reflect the conditions expected in a severe core damage accident, and no change to Table 5-58 (formerly Table 5-49) is needed. Revised Volume 1, Appendix D, Section D.1.1.10 of the CLWR Final EIS states that the core enrichments in the CLWRs preclude any potential for uncontrolled recriticality after a severe core melt accident.

15.05 The commentor asserts that Section S.3.1.1 of the Summary of the CLWR Draft EIS, under Accident Conditions, should spell out that a reanalysis of the design-basis accident conditions would be needed because of reactivity changes to the core and no mention is made of the use of boron as a chemical shim early in core life and its relationship with the TPBARs, nor of the increased reactivity needed, if any, to accomplish the project. The commentor further asserts that a potential impact not mentioned is the effect of different metals such as zircaloy on corrosion interaction with parts of the core and on other primary systems.

Comment Summarized: 41-8

Response: DOE has produced a technical report documenting the design and analysis of a maximum tritium production core using a reference Westinghouse reactor similar to the Watts Bar 1 reactor titled, *Tritium Production Core Topical Report*, (WEC 1998). This report, which is currently being reviewed by the NRC, contains the evaluations of various design-basis accident scenarios performed in the plant safety analysis report. The report has concluded that the insertion of TPBARs would not change the progression of the design basis accidents previously analyzed. Prior to operating the reactor, the NRC will approve the analyses of specific tritium production reactor core configurations. NRC license holders must submit core reload analyses and demonstrate that core performance for a new core configuration, including tritium production cores, are within the licensing basis performance envelope for the plant.

As stated in Volume 1, Appendix A, Section A.3.2 of the CLWR EIS, the normal burnable absorber rods are clad with either type-304 stainless steel or zircaloy-4. The TPBAR cladding and end plugs are manufactured from 20 percent cold-worked type-316 stainless steel. The introduction of TPBAR type-316 stainless steel cladding into the reactor core will not introduce any new and unanalyzed corrosion condition with parts of the core and other primary systems. In September 1997, 32 TPBARs were inserted into the reactor core at Watts Bar 1 as part of a confirmatory demonstration program. To date, the TPBARs and their type-316 stainless steel cladding are performing as designed.

15.06 The commentor, referring to Appendix A, page A-18 of the CLWR Draft EIS, states that the last paragraph indicates that more new fuel assemblies may have to be loaded into the core during each refueling

and that the enrichment of these assemblies may need to be increased. The commentor suggests that analysis be included on flux density, the interaction of chemical shim control on this density over time, and the total impact of this added reactivity on control systems. The commentor further suggests that a safety analysis is needed to determine the increased risk to personnel as a result of an out-of-core criticality incident and the steps taken to prevent one from occurring.

Comment Summarized: 41-13

Response: As indicated in Volume 1, Appendix A, Section A.3.1 of the CLWR EIS, the maximum enrichment for CLWR fuel is limited by the NRC to 5 percent. The *Tritium Production Core Topical Report,* NPD-98-181 (WEC 1998), submitted to the NRC for review in July 1998, evaluated the flux density of a reference tritium production core over time and concluded that no changes to reactivity control systems are required due to the introduction of TPBARs into the core with fuel assembly enrichment approaching 5 percent. In addition, each license holder must submit core reload analyses to the NRC prior to refueling and demonstrate that core performance for a new core configuration, including tritium production cores, is within the licensing basis performance envelope for the plant. Since all CLWRs are currently licensed to handle fuel assemblies with enrichments up to 5 percent, there is no increased risk to personnel as a result of an out-of-core criticality incident. Existing approved plant operating procedures are adequate to handle reactor fuel enriched up to 5 percent and ensure the safety of operating personnel.

15.07 One commentor asserts that the evaluation of human health effects from facility accidents (Appendix D of the CLWR Draft EIS) is not adequate, with three deficiencies:

1. The basis for estimating that 10 percent of the tritium released from the melted targets will be in the oxide form within the containment atmosphere is not documented (Table D-1). In some past safety analysis reports, DOE has assumed that 100 percent of released tritium is in the oxide form and is available for release to the environment. The commentor requests an explanation for the basis of and revision of the analysis.

2. Elemental tritium may be available in the containment atmosphere and released to the environment. The EIS analysis needs to quantify the estimated release of elemental tritium and the resultant safety and environmental effects.

3. The analysis does not address the disposition of tritium remaining in the reactor facility after the first 30 days (Table D-2). Since tritium is very mobile and cannot be easily removed from contaminated coolant water, how much additional tritium will be released to the environment, and with what effects? Also, what are the long-term disposition mechanism and associated environmental impacts for tritium that remain within the containment structure? The CLWR Draft EIS needs to be corrected to address the environmental impacts associated with the disposition of all tritium released in a design-basis accident.

Comment Summarized: 45-6, 503-9

Response:

1. Volume 1, Appendix D, Section D.1.1.2 of the CLWR EIS discusses the reasons for the reduction of tritium water vapor in the containment after a large-break loss-of-coolant accident. It states that the reduction in the amount of tritium available for release would result from post-accident processing and cooling of the containment atmosphere, operation of the hydrogen recombiners, and the absorption of elemental and oxidized tritium by water in the containment. This assumption is consistent with previous DOE analysis performed in support of the *Light Water Reactor (WNP-1) Plant Description-New Production Reactor* (New Production Reactor EIS), documented in a Westinghouse report (WHC 1991).

As a result of these removal processes, the analysis assumes that only 10 percent of the tritium released to the containment would be in the form of tritiated water vapor and would be available for release over a 30-day period following an accident. Tritium and tritiated water vapor would be released to the atmosphere through containment leak paths only. Potential leak pathways from containment are discussed in Volume 1, Appendix D, Section D.1.2.5.2 of the CLWR EIS.

2. The analysis assumed that all tritium released from the containment to the environment was in oxide form. This assumption is very conservative because the dose conversion factors for tritium in oxide form are much greater (by a factor of 10,000) than for elemental tritium gas. As stated in Volume 1, Appendix C, Section C.2.2.2, the total effective dose from a tritium gas exposure is about 10,000 times less than the total effective dose from an equal exposure to airborne tritium oxide.

3. As stated in Volume 1, Appendix D, Section D.1.1.2 of the CLWR EIS, the analysis assumed that, after 30 days, all of the tritiated water vapor in the containment atmosphere would be condensed and would not be available for further release. As part of the post-accident cleanup and restoration activities, the contaminated water remaining in the containment would be treated to remove radioactive fission products and the treated water would be tanked and stored on site to allow the tritium to decay as appropriate before it is recycled and released to the environment via controlled pathways.

15.08 The commentor asserts that it is irresponsible to state that an explosion of the Bellefonte facility is outside of the scope of this EIS. The commentor adds that the Chernobyl Plant accident is a mere decade behind us and that residents around such facilities need to be informed of the results of such an explosion.

Comment Summarized: 116-25

Response: The CLWR EIS was searched for all references to the word "explosion" to identify what postulated explosion the commentor was referencing. Two references to "explosion" were identified:

1. Volume 1, Appendix F addressed issues raised during the Public Scoping Process. One of the issues raised was the possible explosion of a nuclear warhead. DOE's position on this issue has not changed. Appendix F of the CLWR EIS states, "The environmental impacts associated with a possible explosion of a nuclear warhead are speculative and beyond the scope of the CLWR EIS."

2. Volume 1, Section 5.2.10, Safeguards and Security, addresses design-basis threats from a dedicated adversary group with suitable weapons and explosives. The section describes the provisions of the DOE Safeguards and Protection Program. Section 5.2.10 of the CLWR EIS states, "Accidents initiated as a result of sabotage are considered speculative and, accordingly, have not been addressed in the CLWR EIS." DOE has not changed their position on this issue. However, it should be noted that the EIS did evaluate the consequences of severe reactor accidents (i.e., core-disruptive accidents with containment bypass or breach of containment). The consequence of any act of sabotage, including an explosion, is bounded by the analysis of severe reactor accidents. The commentor references the Chernobyl accident and infers that it was an explosion. The accident at Chernobyl is classified as a severe reactor accident, not an explosion. As stated above, this EIS did evaluate severe reactor accidents. The Chernobyl reactor design differs markedly from the reactors proposed for tritium production. The Chernobyl initiating events, accident sequences, and resulting consequences could not occur at U.S. NRC-licensed reactors.

15.09 The commentor refers to Section 5.2.1.9.2 of the CLWR Draft EIS under Radiological Impacts where it states that the assessment of dose and associated cancer risk to the noninvolved worker is not applicable for beyond design-basis accidents. The commentor believes that the rationale given following this statement is of dubious validity and explains that the assumption of a slow-moving accident is not a general case; many scenarios of fast-moving, beyond design-basis accidents exist. The commentor further refers to a statement

made that the public within 10 miles would have been evacuated. The commentor remarks that this evacuation would not occur immediately and most likely would take hours to accomplish. The commentor recommends that the dose and associated cancer risk be evaluated for the noninvolved worker.

Comment Summarized: 146-10

Response: The severe accidents evaluated include containment failure and bypass scenarios, which lead to releases. Each scenario has a warning time and a release time. The warning time is the time at which notification is given to offsite emergency response officials to initiate protective measures for the surrounding population. The release time is the time when the release to the environment begins. At Sequoyah and Watts Bar, the minimum time between the warning time and the release time is two hours. At Bellefonte, the minimum time is one hour. The minimum time of one hour is more than enough time to evacuate onsite personnel. This also conservatively assumes that an onsite emergency has not been declared prior to initiating an offsite notification. Releases from these scenarios take place on an even longer time frame. Therefore, the assumption that consequences to the noninvolved worker need not be considered for beyond design-basis accidents is justified. Volume 1, Sections 5.2.1.9.2, 5.2.2.9.2, and 5.2.3.9.2 of the CLWR EIS have been revised for clarity. The offsite population within the 10-mile Emergency Planning Zone is not evacuated prior to release. The offsite evacuation is initiated at the warning time, as mentioned above. There is a delay time for notification and then a significant time for evacuation, usually on the order of a few hours.

15.10 The commentor remarks that, while Table 5-6 of the CLWR Draft EIS presents risk increments associated with various accidents, the paragraph following this table describes these numbers as the actual risk. The commentor suggests that the terminology between narratives and tables be made consistent.

Comment Summarized: 146-11

Response: Volume 1, Sections 5.2.1.9.2 and 5.2.2.9.2 of the CLWR EIS have been revised to address the commentor's concern.

15.11 The commentor refers to Table 5-32 of the CLWR Draft EIS where the assumption of mean (50 percent) meteorological conditions for the maximally exposed offsite individual is made. The commentor recommends that the worst case credible meteorological conditions be used to bound the risks.

Comment Summarized: 146-14

Response: As stated in Volume 1, Appendix D, Section D. 1.2.4 of the CLWR EIS, the impact analyses were performed in accordance with guidance provided in NRC Regulatory Guide 4.2. This guide recommends using an atmospheric diffusion value (X/Q) corresponding to one tenth of the value determined in Safety Guide No. 4. This safety guide has been revised and reissued as Revision 2, Regulatory Guide 1.4. In 1983, the NRC issued Regulatory Guide 1.145, providing guidance in determining 95th percentile X/Q values using a site meteorological direction-dependent approach. In this analysis, DOE assumes the 95th percentile direction-dependent X/Q values to be consistent with the guidance provided in Safety Guide 4 and Regulatory Guide 1.4. The GENII computer code, which is based on the NRC's current acceptable direction-dependent approach, was used to determine the 50th and 95th percentile meteorological conditions at each site. The results indicated that the estimated doses using 50th percentile meteorological conditions were more than one tenth times the 95th percentile meteorological doses. Therefore, the 50th percentile meteorological condition at each site was used to estimate the consequences.

CATEGORY 16: WASTE MANAGEMENT

16.01 The commentor notes that there likely will be an increase in the generation of low-level radioactive waste which must be stored somewhere and asks about plans to store this waste on site.

Comment Summarized: 116-27, 800-3

Response: As discussed in Volume 1, Sections 5.2.1.11, 5.2.2.11, and 5.2.3.11 of the CLWR EIS, tritium production would increase low-level radioactive waste by 0.1 percent. Low-level radioactive waste would not be stored on site, but would be transported and managed at the low-level radioactive waste facility at Barnwell, South Carolina, or the Savannah River Site. The 40-year production of tritium at CLWRs would produce a total amount of low-level radioactive waste that would fill 0.06 percent of the capacity of one of a series of existing vaults at the Savannah River Low-Level Radioactive Waste Disposal Facility, which has been operational since 1994.

16.02 The commentor remarks that DOE's assertion that waste will be produced and that the waste may be stored on site or in a Federal storage facility does not satisfy the requirements of NEPA.

Comment Summarized: 116-3

Response: The CLWR EIS has been prepared in accordance with the Council on Environmental Quality regulations (40 CFR 1500-1508) and DOE's NEPA regulations (10 CFR 1021) and procedures. To the extent that potential environmental impacts associated with waste management could be identified for the alternatives analyzed, they are included in the CLWR EIS. DOE believes that it has complied with requirements of NEPA for actions analyzed in this EIS including, as applicable, NEPA documentation at disposal sites. This analysis includes the direct, indirect, and cumulative environmental consequences of the production of tritium in three operating CLWRs and the completion and operation of two partially completed commercial reactors.

With respect to the waste produced, the EIS addresses low-level radioactive waste in Volume 1, Sections 5.2.1.11, 5.2.2.11, and 5.2.3.11; it also addresses spent nuclear fuel management in Sections 5.2.1.12, 5.2.2.12, and 5.2.3.12. The CLWR EIS states that additional low-level waste associated with tritium production would be transported and managed at either the Barnwell, South Carolina or the Savannah River Site. Both options are possible and in accordance with the Council on Environmental Quality regulations; both options are evaluated in the CLWR EIS. The CLWR also states that any additional spent nuclear fuel would be stored on site in a dry cask ISFSI facility until a national repository is available. In accordance with the Council on Environmental Quality regulations, the impacts from a generic dry cask ISFSI facility are evaluated in Section 5.2.6 of the CLWR EIS. NEPA documentation would be prepared if and when it becomes necessary to construct a dry cask ISFSI facility at each of the proposed sites.

16.03 The commentor is concerned with onsite leakage of radioactive and other toxic waste.

Comment Summarized: 136-2

Response: As discussed in Volume 1, Chapter 5 of the CLWR Draft EIS, there would be no onsite accidental leakage of radioactive and other toxic waste during normal operations. However, the EIS assumes conservatively that some liquid and gaseous radioactive material could be released. The CLWR EIS addresses the impacts of normal operation releases in Sections 5.2.1.9.1, 5.2.2.9.1, and 5.2.3.9.1. The CLWR EIS addresses the impacts of releases during accident conditions in Sections 5.2.1.9.2, 5.2.2.9.2, and 5.2.3.9.2.

16.04 Commentors oppose tritium production in general and Bellefonte in particular because of concerns about waste removal capabilities from TVA facilities.

Comments Summarized: 50-1, 84-3, 712-3

Response: Currently operating nuclear power plants effectively manage all radioactive waste without any impact to public health and safety. Significant reductions in the quantity and volume of radioactive waste have been achieved during the past 10 years. Low-level radioactive waste is currently subject to volume reduction by compaction and incineration and then shipment to one of several available low-level waste disposal sites in the United States. The Bellefonte plant represents one of the CLWR options for producing tritium (the other options are use of the Watts Bar and/or Sequoyah Nuclear Plants), but the Bellefonte plant, if selected, would also produce electric power for the TVA system.

16.05 The commentor expresses opposition to the proposed action because it would produce at least 50 percent more low-level waste, and disposal of nuclear waste is already a serious problem that this proposal can only exacerbate.

Comment Summarized: 25-3

Response: Volume 1, Sections 5.2.1.11, 5.2.2.11, and 5.2.3.11 of the CLWR EIS state that the additional low-level waste generated due to tritium production at the CLWRs would constitute approximately 0.1 percent of the low-level waste currently being generated at the operating nuclear power plants, or 0.1 percent of the electric power production-associated low-level waste that would be generated at the Bellefonte plant. This small additional low-level waste would be transported to the low-level radioactive waste disposal facility at the Savannah River Site or the low-level radioactive waste facility at Barnwell, South Carolina, where the low-level radioactive waste of the reactor facilities is normally transported and disposed. The 40-year total low-level radioactive waste generated from tritium production represents 0.06 percent of the capacity of one vault at the facility at the Savannah River Site, which contains a series of vaults for low-level radioactive waste storage. The amount of additional low-level radioactive waste produced at a CLWR due to tritium production is a very small fraction (0.1 percent) of that already produced. United States CLWRs have been successfully reducing the activity, amount, and volume of low-level waste they produce by using advances in technology and improving operational and maintenance procedures. Further reductions in low-level radioactive waste production are expected to be far greater than the small increase due to tritium production. CLWRs send low-level radioactive waste to operating licensed low-level waste disposal facilities.

CATEGORY 17: SPENT NUCLEAR FUEL MANAGEMENT

17.01 The commentor states that the generation of additional spent fuel waste and removal and shipment of TPBARs is not the "normal" operation of a CLWR. DOE must be forthright about the changes in normal operations required to produce tritium.

Comment Summarized: 94-12

Response: The impacts of tritium production on reactor operations are discussed qualitatively in Section 3.1.3 of the CLWR EIS. As indicated in this section, tritium could be produced with only a few impacts on the normal operation of the reactor. The terminology used ("normal operation") reflects that a CLWR can continue to operate and produce electricity with no disruption. The environmental impacts resulting from these operations and differences are evaluated and presented in detail in Volume 1, Chapter 5.

17.02 The commentor expresses opposition to the proposed action because production of tritium at a commercial nuclear plant will produce much more nuclear waste—three times more high-level waste than the plant would produce under normal operating conditions by DOE's own estimate.

Comment Summarized: 25-2

Response: Volume 1, Sections 5.2.1.12, 5.2.2.12, and 5.2.3.12 of the CLWR EIS address spent nuclear fuel management at each of the sites and present the fact that up to 2,000 TPBARs can be irradiated in the reactor core of each CLWR without generating any additional spent nuclear fuel. In implementing the proposed action, DOE and TVA would manage the tritium production process to minimize, to the extent practicable, the generation of additional spent nuclear fuel. The CLWR EIS addresses the impacts of additional spent nuclear fuel generation in Section 5.2.6.

17.03 The commentor expresses concern about the storage of spent fuel. If the Nuclear Waste Policy Act of 1982 mandates that spent fuel will be managed at a national repository, then DOE needs to expedite and assist in resolving the siting issues and not create additional onsite spent fuel storage facilities. The commentor further recommends that the last major planning assumption of paragraph S.3.2.1 on page 17 of the CLWR Draft EIS Summary be revised to state that spent fuel rods resulting from the tritium project will be stored at an existing spent fuel storage facility until the national repository becomes operational in accordance with the Nuclear Waste Policy Act of 1982.

Comments Summarized: 58-4, 610-4

Response: DOE is committed to the development of a licensed national spent nuclear fuel waste repository. This commitment is being actively pursued by DOE. Siting and development of a repository is ongoing, and the location and opening date for a suitable repository has not been determined. The last major assumption in Section S.3.2.1 of the CLWR EIS Summary correctly states that additional spent nuclear fuel would be generated if more than 2,000 TPBARs were irradiated in a fuel cycle. In implementing the proposed action, DOE and TVA would manage the tritium production process to minimize, to the extent practicable, the generation of additional spent nuclear fuel. The assumption on Summary page 17 of the CLWR Draft EIS correctly states that, for the purposes of calculating conservative and bounding environmental impacts, the maximum possible additional spent nuclear fuel generated due to irradiating 3,400 TPBARs in each fuel cycle is assumed. The environmental impacts of a dry cask ISFSI designed specifically for this conservatively assumed amount of additional spent nuclear fuel are presented in the CLWR EIS as a bounding case. The CLWR EIS conservatively assumes that dry spent fuel storage will be required without the availability of a national repository during the tritium production time frame. This assumption bounds the environmental impact of spent fuel storage since the availability of a national repository would result in a smaller environmental impact than that presented in the CLWR EIS.

17.04 The commentor, referring to Section 3.2.1 of the CLWR Draft EIS regarding the explanation (according to the commentor) that DOE essentially is deferring questions about the management/storage of spent fuel, remarks that, since Watts Bar does not have fuel storage capacity for the time period under consideration in this proposed action (40 years), issues of spent fuel storage and management cannot be finessed, but must be discussed in detail, specific to each reactor under consideration.

Comment Summarized: 94-18

Response: The CLWR EIS specifically addresses the most conservative scenario with regard to spent nuclear fuel storage at Watts Bar (and all the CLWRs being considered for tritium production). This scenario assumes that no spent nuclear fuel national waste repository will be available for the entire 40-year tritium production time frame, so additional dry cask spent nuclear fuel storage would be required. Volume 1, Sections 4.2.1.11,

4.2.2.11, and 4.2.3.11 of the CLWR EIS, in conjunction with the projected spent nuclear fuel generation numbers in Chapter 5, also show that the spent nuclear fuel pool storage capacity of each nuclear power plant would not be adequate for the amount of spent nuclear fuel discharged during the entire licensed electric power production time period without any consideration of tritium production. Therefore, each considered CLWR would need to provide additional spent nuclear fuel storage capacity even if it is not used for tritium production.

17.05 The commentor refers to Section 4.2.3.11, where the CLWR Draft EIS describes storage capacity at Bellefonte and says that each unit has a storage pool which has the capacity to hold 1,058 spent fuel assemblies. The commentor asks whether the pool can or cannot accommodate 3,400 TPBARs every 18 months for 40 years.

Comment Summarized: 94-22

Response: The 3,400 TPBARs would be inserted into all 141 fuel assemblies in the Bellefonte reactor core. When the fuel is discharged to the storage pool, the TPBARs would only remain in the pool for a period of one to two months before being consolidated and loaded into transportation casks for shipment to the Savannah River Site. Therefore, the Bellefonte spent nuclear fuel storage pool can accommodate the 3,400 TPBARs that would be discharged every 18 months for the one- to two-month time period after each fuel cycle prior to their shipment to the Savannah River Site.

17.06 The commentor refers to Table 5-42 of the CLWR Draft EIS, where the environmental impacts for dry cask storage are considered generically. The commentor asserts that the information about earthquake and tornado damage is not sufficient to allow the reader to determine the adequacy of this method of estimating environmental impacts.

Comment Summarized: 94-23

Response: The information in Volume 1, Table 5-51 (formerly Table 5-42) of the CLWR EIS, regarding earthquake and tornado accidents, reflects the fact that all NRC-licensed dry spent nuclear fuel storage designs are required by law to withstand earthquakes and tornadoes without posing any unacceptable risk to public health and safety. The environmental impact of dry cask spent nuclear fuel storage presented in Volume 1, Section 5.2.6 of the CLWR EIS assumes that any storage system used for spent nuclear fuel would be licensed by the NRC. The NRC evaluates the safety of each spent nuclear fuel storage system and confirms that, for accidents such as tornadoes and earthquakes, they meet all regulatory requirements, including design safety and acceptable consequences. All currently NRC-licensed dry cask spent nuclear fuel storage designs present safety analyses that show that earthquakes and tornadoes would result in no radiological consequences to the public.

17.07 The commentor refers to page A-23 of Appendix A of the CLWR Draft EIS. The commentor remarks that the numbers on that page indicate that Bellefonte would produce an additional 1,863 spent fuel assemblies if it were selected to produce tritium. The commentor adds that this number exceeds the total capacity of Bellefonte's current spent fuel pools.

Comment Summarized: 94-26

Response: As indicated in Volume 1, Appendix A, Table A-1, the operation of each of the Bellefonte units without tritium production would generate approximately 1,944 spent nuclear fuel assemblies over a 40-year period (i.e., 72 fuel assemblies per operating cycle x 27 operating cycles of 18 months each.) This number also exceeds the total capacity of Bellefonte's current spent nuclear fuel pools. Therefore, additional spent nuclear fuel storage beyond the pool capacity would be required at Bellefonte whether or not it is used for tritium

production. The environmental impacts of a dry cask ISFSI system are presented in Volume 1, Section 5.2.6 of the CLWR EIS. This section presents the environmental impacts from construction, operation, and postulated accidents.

17.08 The commentor states that, if tritium is produced at levels that increase reactor fuel consumption, the EIS should clarify who owns the additional spent nuclear fuel and who will pay for its eventual treatment, storage, and disposal.

Comment Summarized: 127-4

Response: As the licensee for the CLWRs under consideration for tritium production, TVA is responsible for all spent nuclear fuel. A DOE interagency agreement with TVA would provide the financial terms for the treatment, storage, and disposal of any additional spent nuclear fuel that may be generated from the production of tritium.

17.09 The commentor states that the CLWR Draft EIS does not discuss the fact that there is no disposal site for spent fuel, so the environmental effects of tritium production could include centuries of on site spent fuel storage at commercial reactor site(s).

Comment Summarized: 137-9

Response: The operating and shut-down CLWRs in the United States are expected to have generated over 183,000 spent nuclear fuel assemblies (85,000 metric tons of uranium) by the end of their licensed lifetime. The additional spent nuclear fuel generated for 40 years of tritium production represents approximately 1 percent of this spent fuel inventory. Currently licensed technology exists for interim storage of spent nuclear fuel. DOE is committed to the development of a licensed national spent nuclear fuel waste repository. This waste repository will be required for the spent nuclear fuel that has been produced while generating electric power. The tritium production contribution to this spent nuclear fuel of about 1 percent will not affect the design or schedule for completion of this repository. The impacts from an onsite dry cask ISFSI are discussed in Volume 1, Section 5.2.6 of the CLWR EIS.

17.10 The commentor states that the CLWR Draft EIS mentions numerous times that production of tritium in a CLWR may result in more spent fuel, and this fuel will have higher enrichments and lower burnup than fuel currently discharged to the spent fuel pools; thus, it will have higher reactivity. The commentor remarks that the CLWR EIS contains no discussion of the effects of this high reactivity fuel on spent fuel pool design parameters or spent fuel pool fuel handling accidents. The commentor recommends that a detailed analysis be done to determine the effects of this high reactivity fuel on the various plants' spent fuel pools, and on fuel pool and fuel handling accident analyses, and a discussion of the results should be included in the CLWR Final EIS.

Comment Summarized: 146-1

Response: Full production loading of TPBARs may require the use of slightly higher enriched fuel (up to approximately 4.9 percent, compared to approximately 4.5 percent currently used). Such an increase would be allowed by the current NRC licenses (current licensing provisions allow for up to 5 percent enrichment); thus, the reactor systems and equipment are already designed to accommodate fuel enriched to the level required for tritium production. The somewhat higher enrichments and reduced fuel assembly burnups associated with the tritium production core, as compared to the conventional core designs, can influence the radiological source term used in the calculation of radiological emissions other than tritium during normal operation and accident conditions. The *Tritium Production Core Topical Report* (WEC 1998) quantified this effect and concluded that, overall, the fission product inventories were the same or lower in the tritium-

producing core. Therefore, the analysis presented in the CLWR EIS, which does not account for the increased enrichment, is conservative. It is also not expected that the higher enrichments and reduced fuel assembly burnups would affect the design parameters of the existing spent fuel pools. The NRC will review these parameters when the reactor facility applies for a licensing amendment to operate in a tritium-producing mode.

17.11 The commentor states that there is no discussion of the effect of the high reactivity fuel on the postulated geologic repository. The commentor poses the following questions: Since there will be much more spent fuel generated by this process, will this affect the capability of the geologic repository to accept fuel from other CLWRs? Will its high reactivity make it ineligible for geologic storage or cause it to require special handling? The commentor recommends that these issues should be evaluated and discussed in the CLWR Final EIS.

Comment Summarized: 146-2

Response: The maximum number of additional spent nuclear fuel assemblies (e.g., 1,863 at Bellefonte) generated for the 40-year CLWR production of tritium represents less than 1 percent of the total mass of spent nuclear fuel expected to be placed in a future geologic repository. The maximum uranium-235 enrichment of this spent fuel would be approximately 4.9 percent (less than 5 percent). The TVA reactors under consideration use commercial nuclear fuel with uranium-235 enrichments as high as 4.5 percent. The trend in reload fuel at nuclear power plants has been toward higher uranium-235 enrichments. Since current and future projected nuclear fuel is expected to be similar in enrichment to the fuel used in tritium production, and the spent nuclear fuel associated with tritium production represents less than 1 percent of all the spent nuclear fuel to be discharged into the repository, the CLWR spent nuclear fuel associated with tritium production is expected to be compatible with repository requirements and should have no significant effect on repository reactivity and require no special handling.

17.12 The commentor, referring to the Uranium Fuel Cycle and Waste Management entry of Table 5-38 in the CLWR Draft EIS, remarks that it discusses only transportation. The commentor recommends that issues associated with additional onsite storage capacity for spent fuel also be discussed.

Comment Summarized: 146-16

Response: Environmental impacts of onsite spent nuclear fuel storage are analyzed in Volume 1, Section 5.2.6 of the CLWR EIS. As discussed in Section 5.2.4.2 of the CLWR EIS, Table 5-47 (CLWR Draft EIS Table 5-38) includes the issues that need to be addressed by the licensees as part of the life extension license renewal application. Issues of lesser importance which appear in 10 CFR 51, Subpart A, Appendix B, were not included in Table 5-47. The finding under Onsite Spent Fuel in the 10 CFR 51 table states: "SMALL. The expected increase in the volume of spent nuclear fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or retrievable storage is not available." Section 5.2.6 of the CLWR EIS reaffirms this NRC finding for storage of spent nuclear fuel in a dry cask ISFSI.

17.13 The commentor asks that the EIS include the assumptions behind the conservatively estimated dose to a worker from the ISFSI, CLWR Draft EIS, page 5-94, top of the page.

Comment Summarized: 146-18

Response: These assumptions are presented in the two references, DUKE 1988 and BGE 1989b as indicated on the referenced page. The nature of this conservatism is due principally to the time and dose rate estimates for each operation in loading a dry spent nuclear fuel storage cask.

17.14 The commentor states the following: Page 5-94 of the CLWR Draft EIS, second paragraph, states no chemical, biocide, or sanitary wastes would be generated in the operation of the ISFSI. This disagrees with Table 5-41, which implies that small amounts of these would be generated. The commentor suggests that the two references should be consistent.

Comment Summarized: 146-19

Response: The information presented in Volume 1, page 5-94 and in Table 5-41 of the CLWR Draft EIS is consistent. The waste generation presented in Table 5-41 (now Table 5-50 in the CLWR Final EIS) occurs only during the process of loading the fuel from the spent nuclear fuel pool into the transfer cask and subsequently into the storage cask. Once the storage casks are loaded, they do not generate any chemical, biocide, or sanitary waste. This is explained in the second paragraph on page 5-94 of the CLWR Draft EIS. There was no change to this text in the CLWR Final EIS.

17.15 The commentor remarks that the United States has yet to find a safe, permanent storage facility for radioactive waste and adds that, until it does so, creating more radioactive waste, no matter how small, is environmentally and socially irresponsible.

Comment Summarized: 102-4

Response: DOE would be responsible for the low-level radioactive waste generated by tritium production. The amount of low-level radioactive waste resulting from tritium production would represent approximately 0.1 percent of the total low-level radioactive waste currently generated at the site. The 40-year production of tritium at CLWRs would produce a total amount of low-level radioactive waste which would fill 0.06 percent of the capacity of one of a series of existing vaults at the Savannah River Low-Level Radioactive Waste Disposal Facility, which has been operational since 1994. Additional spent nuclear fuel would be generated for tritium production if more than 2,000 TPBARs were irradiated in a single reactor core. The impacts from storing the additional spent nuclear fuel are discussed in Volume 1, Section 5.2.6 of the CLWR EIS. In implementing the proposed action, DOE and TVA would manage the tritium production process to minimize, to the extent practicable, the generation of additional spent nuclear fuel.

17.16 The commentor asks if the speaker at the public hearing meant to say that: (1) reactor units at either the Watts Bar or Sequoyah plants would generate 75 percent more spent fuel if they were run at the higher rate required for tritium production; and (2) spent fuel generation would double if tritium were produced in one of the Bellefonte units.

Comment Summarized: 700-5

Response: The commentor's statements are accurate. Impacts associated with tritium production and the generation of spent nuclear fuel are summarized in Volume 1, Section 3.2.6.2 of the CLWR Final EIS for Watts Bar, Sequoyah, and Bellefonte.

17.17 The commentor states that tritium production in excess of 2,000 targets per year would generate additional spent fuel. The commentor requests clarification concerning whether any of the three TVA nuclear power plants is capable of managing their existing and projected spent fuel load and whether adding to it would only complicate the situation.

Comment Summarized: 700-7

Response: Volume 1, Sections 5.2.1.12, 5.2.2.12, and 5.2.3.12 of the CLWR EIS address spent nuclear fuel management at each of the sites and indicate that all three TVA nuclear power plants are capable of managing

their existing and projected spent nuclear fuel load. The management of spent nuclear fuel is a well-understood process at nuclear power plants. Many nuclear power plants are managing their spent nuclear fuel by constructing supplementary dry cask storage facilities on site. The proposed action would add more spent nuclear fuel if more than 2,000 TPBARs were irradiated in any one reactor core. With 2,000 or less TPBARs, there would be no impact on spent nuclear fuel storage requirements. If more than 2,000 TPBARs were irradiated in a reactor, the additional spent nuclear fuel would be accommodated in the same manner in which TVA would manage its projected additional spent nuclear fuel without tritium production. In implementing the proposed action, DOE and TVA would manage the tritium production process to minimize, to the extent practicable, the generation of additional spent nuclear fuel.

CATEGORY 18: TRANSPORTATION

18.01 The commentor questions how much additional risk is involved in transporting the TPBARs to South Carolina to remove tritium versus transporting the TPBARs somewhere else for disposal.

Comment Summarized: 23-2

Response: The TPBARs would be transported to the Tritium Extraction Facility at the Savannah River Site in Aiken, South Carolina, as stated in Volume 1, Sections 1.5.2.2 and 3.2.1 of the CLWR EIS. The Tritium Extraction Facility is an integral part of the program to produce tritium in a CLWR. Volume 1, Appendix E provides a conservative analysis of the health and environmental impacts along the transportation routes. Volume 1, Tables E-7 and E-8 show the per-shipment risk analysis, and Table E-9 summarizes the risk of transporting hazardous materials.

18.02 The commentor cannot find the definition for "associated impacts of transporting."

Comment Summarized: 86-3

Response: The phrase quoted by the commentor appears in the CLWR EIS Summary, S.1.6.1.2, in the context of topics addressed in the environmental assessment document for the Lead Test Assembly. Section 5.5 of the *Environmental Assessment, Lead Test Assembly Irradiation and Analysis, Watts Bar Nuclear Plant, Tennessee and Hanford Site, Richland, Washington* (DOE/EA-1210) (DOE 1997a) describes the impacts associated with transporting both unirradiated and irradiated TPBAR lead test assemblies. The CLWR EIS addresses the environmental impacts associated with the transportation of TPBARs in Volume 1, Section 5.2.8 and Appendix E. In both documents, the NEPA analysis addresses incident-free transportation impacts and transportation accident impacts. Those impacts include external radiation exposures (in-transit doses to the public or transport workers), nonradiological impacts due to pollutants emitted by the transport vehicles, vehicular accident fatalities, and maximum individual doses (on site and off site) resulting from breaches in the shipping cask or damage to the cask shielding.

18.03 The commentor states that the analysis for transportation impacts should consider the expected timing of shipments (regular basis stretched throughout the year or in bursts over a brief period every 18 months).

Comment Summarized: 94-16

Response: TPBARs would be transported in batches as a core load of irradiated TPBARs becomes ready for shipment. TPBARs do not come out of the reactor core on a regular basis spread throughout the year. They are only removed from the core when the core is refueled. In any case, the timing does not affect the risk, since the number of TPBARs per shipment is solely a function of the cask, and the number of shipments is a

function of the production rate. The transportation analysis considered this in the per-shipment analysis shown in Volume 1, Appendix E, Tables E-7 and E-8, and reported the risks for the entire program (40 years) in Table E-9.

18.04 The commentor states that the risks associated with the leakage of radioactive material that could occur during the transportation of irradiated TPBARs should not be taken.

Comment Summarized: 136-4

Response: The Type B packages that would be used to transport irradiated TPBARs associated with the CLWR program are designed to withstand test conditions (described in Volume 1, Appendix E, Section E.3.2 of the CLWR EIS) representing extremely severe accidents (estimated to be more severe than over 99 percent of all accidents that could occur), while maintaining the packaged radioactive contents. Type B packages have been used for years to ship radioactive materials in the United States and around the world. To date, no Type B package has ever been punctured or has released any of its contents, even in actual highway accidents. As described in Volume 1, Section E.3.2 of the CLWR EIS, the Type B package is extremely robust and provides a high degree of confidence that, even in extremely severe accidents, the integrity of the package would be maintained with essentially no loss of the radioactive contents or serious impairment of the shielding capability. Section 5.2.8 of the CLWR EIS summarizes the impacts from transporting TPBARs from each reactor site to the Savannah River Site under incident-free and accident scenarios. Appendix E provides specific details on the transportation impact evaluations.

18.05 The commentor asks whether transporting TPBARs from three different reactors in two states would increase the opportunities for a transportation accident.

Comment Summarized: 703-4

Response: The likelihood of a transportation accident is proportional to the distance traveled. The per-shipment accident risk factors are shown in Volume 1, Appendix E, Table E-8 of the CLWR EIS. Since each of the possible CLWR sites is about the same distance from the Savannah River Site, the per-shipment accident risk is within 10 percent for each. The number of shipments required to transport the TPBARs is independent of the site chosen, but is related to the number of TPBARs produced. Appendix E, Table E-9, shows the traffic accident risks associated with different production rates at different sites.

18.06 The commentor asks whether DOE plans for a single truck to pick up irradiated TPBARs at each reactor and transport them collectively to the Savannah River Site.

Comment Summarized: 703-5

Response: A truck is capable of carrying one and only one of the Type B transportation casks that would be used for irradiated TPBARs. A cask would be loaded at a CLWR site, placed on a truck, and transported directly to the Savannah River Site. It would not stop at other CLWRs to pick up additional material.

18.07 The commentor says he believes the additional shipping requirements for tritium production are likely to cause accidents and traffic problems. The commentor states that the transportation accident risk found in the CLWR Draft EIS is exceedingly low—less than one fatal accident per 100,000 years is unrealistic. The commentor is concerned about the potential effect of transportation accidents on interstate traffic. The commentor wonders whether other agencies like the Tennessee Emergency Management Agency or the Federal Emergency Management Agency have plans to deal with any accidents, because accidents are inevitable in any line of work.

Comment Summarized: 707-2

Response: DOE has analyzed accident risks based on the best available transportation statistics and believes that it is unlikely that a traffic fatality will occur as a result of the 40-year program. The results of the analysis shown in Volume 1, Appendix E, Table E-9 of the CLWR EIS indicate that, depending on the alternative selected, the transportation accident risk is significantly lower than one fatal accident per 100,000 years. DOE would develop emergency plans with the carrier and state, local, and Tribal officials and would provide training courses for first responders along the transportation routes to enhance their capabilities to respond appropriately in the unlikely event of an accident. Technical assistance would also be provided to supplement existing resources if any deficiencies are identified. State, local, and some Tribal governments have the basic capabilities and training that would be required in order to take initial measures to respond to a transportation accident by virtue of their preparation for responding to accidents involving hazardous materials (e.g., assess the scene, administer emergency care, control the area, and call for a hazardous materials special team). In the unlikely event that a serious accident does occur, state and local responders would be the first to arrive at the scene, as they would to any overland shipment involving hazardous materials. If requested by state, Tribal, or local government, DOE would send a radiological monitoring assistance team from the closest of eight DOE regional offices located across the country.

18.08 The commentor opposes the radioactive waste associated with TPBARs being transported for disposal to the Savannah River Site or the Barnwell disposal facility.

Comment Summarized: 18-3

Response: Volume 1, Appendix E, Section E.5.3 of the CLWR EIS describes the amount of low-level radioactive waste generated during tritium production at a CLWR. Tables E-7 and E-8 show the per-shipment risk analysis, and Table E-9 summarizes the risk of transporting hazardous materials. The two to eight shipments of low-level waste over the entire program do not significantly increase the traffic or the risk in the State of South Carolina. The commentor's objection to the shipments is noted. Radioactive waste, similar to that associated with tritium production, is currently being shipped safely to the Savannah River Site and the Barnwell facility as part of their ongoing operations.

18.09 The commentor suggests that the CLWR EIS be revised to include an explanation of the response to a transportation accident and the impacts if a spill occurred.

Comment Summarized: 27-1

Response: DOE would develop emergency plans with the carrier and state, local, and Tribal officials and would provide training courses for first responders along the transportation routes to enhance their capabilities to respond appropriately in the unlikely event of an accident. Technical assistance also would be provided to supplement existing resources if any deficiencies are identified. State, local, and some Tribal governments have the basic capabilities and training that would be required to take initial measures to respond to a transportation accident by virtue of their preparation for responding to accidents involving hazardous materials (e.g., assess the scene, administer emergency care, control the area, and call for a hazardous materials special team). In the unlikely event that a serious accident does occur, state and local responders would be the first to arrive at the scene, as they would to any overland shipment involving hazardous materials. If requested by state, Tribal, or local governments, DOE would send a radiological monitoring assistance team from the closest of eight DOE regional offices located across the country. Volume 1, Section 5.2.8 of the CLWR EIS summarizes the impacts from transporting TPBARs from each reactor site to the Savannah River Site under incident-free and accident scenarios. Appendix E provides specific details on the transportation impact evaluations.

18.10 The commentor states that the risks associated with the leakage of radioactive material that could occur during the transportation of spent fuel rods and other wastes should not be taken.

Comment Summarized: 136-5

Response: Transportation of spent fuel rods (or spent fuel assemblies) is not in the scope of the CLWR EIS, as described in Volume 1, Chapter 1. The irradiated TPBARs and TPBAR-related low-level radioactive wastes are transported in Type B packages, as described in the response to Comment Summary 18.04.

18.11 The commentor is concerned with environmental factors and the health and safety of the population along the transport routes, particularly at and near the vicinity of the Savannah River Site.

Comment Summarized: 18-4

Response: Volume 1, Section 5.2.8 and Appendix E of the CLWR EIS provide a conservative analysis of the health and environmental impacts along the transportation routes. Some impacts are in the area of the Savannah River Site. The analysis shows that impacts on the environment and human health and safety are minor; the EIS finds that it is unlikely that transportation of hazardous materials will cause an additional latent or immediate fatality.

18.12 The commentor states that the transportation of raw materials to the TPBAR fabrication facility should be discussed in Section 5.2.8.

Comment Summarized: 146-20

Response: Volume 1, Section 5.2.7 of the CLWR EIS describes the materials needed for the fabrication of TPBARs. Raw materials required include stainless steel, zircaloy, aluminum, zirconium, lithium carbonate, and aluminum oxide. None of these raw materials is considered to be hazardous, and none is radioactive. These materials are commercially available. As stated in Section 5.2.7, no environmental consequences of any significance are expected from activities other than fabrication and assembly of the TPBARs.

CATEGORY 19: DESIGN AND FABRICATION OF TPBARs

19.01 The commentor, referring to Section 5.1.2 of the CLWR Draft EIS, suggests that the statement, "Experience with boron burnable absorber rods bounds what would be expected from tritium production burnable absorber rods," needs more amplification. The commentor further notes that there are several types of boron burnable absorber rods with different materials of construction, and that the number of boron burnable poison rods installed in a core is much less than the possible number of TPBARs that would be installed for tritium production.

Comment Summarized: 146-9

Response: The subject assumption has been removed in the CLWR EIS. The CLWR Draft EIS assumes that two TPBARs fail in each core load of TPBARs and that the entire tritium inventory is released to the reactor coolant and then to the environment. This is extremely conservative, since there has not been a single burnable absorber rod failure in the last 18 years, during which time over 500,000 such rods made by Westinghouse have been irradiated. As discussed in Volume 1, Section 1.9, the CLWR EIS has been revised to reflect the recent Westinghouse data on burnable absorber rods (WEC 1999). While the CLWR EIS still evaluates the

failure of two TPBARs, this event is now categorized as an “abnormal" event that could happen in a given operational cycle, not normal operation.

19.02 The commentor requests information on the Pacific Northwest National Laboratory tests performed to show that tritium targets are satisfactory; they do not leak tritium during irradiation; and that tritium can be quantitatively recovered. The commentor requests a copy of the test results.

Comment Summarized: 4-2

Response: The question refers to the Lead Test Assembly program in Watts Bar 1. Prior to September 1997, the specific TPBAR design described in the CLWR EIS had not been used in a commercial reactor. DOE developed a series of experimental test designs between 1974 and 1992. The series of designs concluded with an irradiation test of 10 5-foot long rods in the Advanced Test Reactor at Idaho National Engineering and Environmental Laboratory in 1990-1991. The test conditions were similar to conditions that are found in a typical pressurized water reactor. Test data indicated that the rod performance was consistent with the performance expectations that existed prior to the tests. Post-irradiation examination of those test rods indicated that there were no failures and confirmed that the performance met the design requirements as defined in 1990.

The TPBAR design that would be employed in commercial reactors was developed using those early DOE designs as a basis; however, additional improvements have been made to those designs. DOE has relied upon the irradiation test information from those previous programs to provide insight into the operational characteristics of the TPBARs. Based on knowledge gained from those programs, DOE designed and fabricated the lead test assemblies. During the design process, specific performance requirements for the TPBAR components were mandated to assure satisfactory target performance during operation.

During those early test programs, research and development were also initiated on techniques to extract tritium from the targets. In the last several years, DOE has performed extraction experiments both on previously irradiated test specimens and on "simulated" TPBARs (using deuterium instead of tritium). The results of these tests have indicated that DOE will be able to efficiently recover tritium from the TPBARs.

The analytical conclusions of the test program can be found in the Lead Test Assembly Technical Report, *Report on the Evaluation of the Tritium Producing Burnable Absorber Rod Lead Test Assembly*, Rev. 1 (PNNL 1997). The NRC assessment of the technical report can be found in NUREG-1607 (NRC 1997).

19.03 The commentor requests information on the structural design to keep the TPBARs stable in the reactor and suggests that, since the target design appears to be a cantilevered-top-attached target, it would be subject to damage during irradiation from water flow vibration.

Comment Summarized: 4-3

Response: The TPBAR design is a cantilevered-top-attached target, as the commentor suggests. The external dimensions and design features of the TPBAR are virtually identical to the design used for discrete burnable absorber rods used for reactivity control in many commercial pressurized water reactors. The TPBAR was intentionally designed to be mechanically similar to these commercial burnable absorbers. Many thousands of the commercial burnable absorbers have been irradiated to date with no damage from flow-induced vibration. Elimination of flow-induced vibration was one of the many functional criteria placed upon the TPBAR design.

19.04 The commentor, referring to information contained in a PNNL report (PNNL-11419) questions the validity of the quantity of tritium release (1,890 Curies) which appeared in Table 3-13 of the CLWR Draft EIS under "Radioactive Emissions." The commentor suggests that the quantity should be 22,780 Curies.

Comments Summarized: 44-8, 501-10

Response: Pacific Northwest National Laboratory Report No. 11419 (PNNL 1997) is the technical report for the lead test assembly rods that were inserted into the Watts Bar 1 reactor in 1997. The functional design criterion on leakage was established as 6.7 Curies per rod per year. [This is a limit; not a leakage rate.] For full core production, a leakage of 6.7 Curies per rod per year was deemed unacceptable. DOE has considered the "lessons learned" from the Lead Test Assembly program and has designed and analyzed an improved production TPBAR model. The production TPBAR is designed to an average permeation rate of 1 Curie per rod per year. The commentor used the 6.7-Curie per rod per year leakage to arrive at 22,780 Curies. The design and analysis is found in NDP-98-181, *Tritium Production Core Topical Report* (WEC 1998).

19.05 The commentor refers to a statement in the CLWR Draft EIS that the system is so effective that the rods will have to be heated to 1,000° C (1,800° F) to recover the tritium captured. The commentor also refers to another area in the CLWR Draft EIS where the design temperature maximum of the extraction furnace at the Tritium Extraction Facility is said to be 1,100° C. The commentor suggests that operating the equipment within 10 percent of the maximum temperature is not a good practice and that the recovery process may be flawed.

Comments Summarized: 44-9, 501-11

Response: DOE has performed extensive research and development on techniques to extract tritium from the targets. The results of these tests have indicated that DOE will be able to efficiently recover tritium from the TPBARs within the temperature limitations noted in the Tritium Extraction Facility EIS and Volume 1, Section 3.1.2 of the CLWR EIS. These research and development efforts have been used to establish the furnace design values. Specific warranties and limitations with respect to furnace lifetime will be addressed during the furnace procurement process.

19.06 The commentor suggests that the CLWR Draft EIS should have used a TVA experience statistic for the "fuel rod burns" rather than a national statistic.

Comments Summarized: 86-6, 703-7

Response: It is assumed that the commentor is questioning the validity of the assumption that two TPBARs could fail per cycle. This assumption is, in fact, extremely conservative. Because of similarities between the TPBAR design and commercial burnable absorber rods used in nuclear reactors, the TPBAR failure rate is expected to be as low as the failure rate for these commercial burnable absorbers. Electric Power Research Institute Report NP-1984, *Control Rod Materials and Burnable Absorbers* (November 1981) (EPRI 1981) indicates statistics for burnable absorber rod failures through 1980 as 2 in 29,700 rods. The two failures were attributed to early manufacturing defects that were corrected in later fabrication campaigns. In the 17 years since that report was written, Westinghouse has fabricated over 500,000 burnable absorber rods with no observable failures. This includes the burnable absorber rods irradiated in the TVA reactors.

While TPBARs are not expected to fail during reactor operation, a failure rate of two TPBARs per cycle was chosen in the CLWR Draft EIS to provide a conservative and bounding estimate for environmental analysis. The impact of two failed TPBARs was assessed to show that the plant is capable of safely operating and that plant releases can be maintained within regulatory limits even in the unlikely event of two TPBAR failures. As indicated in Volume 1, Section 1.9, the CLWR Final EIS has been revised to reflect the recent

Westinghouse data (WEC 1999). While the CLWR Final EIS still evaluates the failure of two TPBARs, this event is now categorized as an abnormal event and is not part of normal operations.

19.07 Referring to the material composition of the TPBARs, the commentor questions whether all the lithium-6 necessary for the fabrication of the TPBARs is already available or needs to be produced. The commentor suggests that, if lithium-6 needs to be produced, the environmental impacts of its production need to be documented in the EIS.

Comment Summarized: 94-13

Response: As discussed in Volume 1, Section 5.2.7 of the CLWR EIS, the quantities of lithium required for the fabrication of the TPBARs have been mined and processed and are part of DOE's inventory of material resources. Therefore, no environmental consequences are expected from activities other than the fabrication and assembly of the TPBARs.

19.08 The commentor requests an explanation of the fact that, while during the public hearings for the Environmental Assessment of the Lead Test Assembly DOE assured the public that leakage from TPBARs was virtually impossible, the CLWR Draft EIS states in Volume 1, Section 3.1.3 that, "some tritium is expected to permeate through the TPBARs during normal operation."

Comment Summarized: 94-14

Response: The performance of the TPBAR getter is such that there is virtually no tritium in the TPBARs available in a form that could permeate through the TPBAR cladding. For conservatism, the CLWR EIS makes the assumption that 1 Curie of tritium per year could permeate through the cladding and be released to the environment. In comparison to the total quantity of tritium produced (nominally 10,000 Curies per TPBAR), this permeation rate is very small, and yet a conservative quantity.

19.09 The commentor opines that the discussion of environmental impacts in the CLWR Draft EIS is flawed because it does not fully explain that TPBARs are a new technology, so there are great uncertainties in their use, including the actual leakage rate, which could be much larger than the 1 Curie per year estimate, or explain the environmental effects of handling, storing, and transporting them.

Comment Summarized: 137-8

Response: The TPBAR concept is not entirely new. Prior to September 1997, the specific TPBAR design described in the EIS had not been used in a commercial reactor. Between 1974 and 1992, DOE developed a series of experimental test designs. The series of designs concluded with an irradiation test of 10 5-foot-long rods in the Advanced Test Reactor in 1991. The test conditions in the loop were similar to conditions that are found in a typical pressurized water reactor. Test data indicated that the rod performance was consistent with the performance expectations that existed prior to the tests. Post-irradiation examination of those test rods indicated that there were no failures during operation.

The TPBAR design was developed using those early DOE designs as a basis; however, additional improvements have been made to those designs. DOE has relied upon the irradiation test information from those previous programs to provide insight into the operational characteristics of the TPBAR design. Based on knowledge gained from those programs, DOE designed and fabricated 32 TPBARs that were inserted into the Watts Bar 1 Nuclear Reactor in lead test assemblies in September 1997. To date, these lead test assemblies are performing as expected and there are no indications of failure. When the TPBAR lead test assemblies are removed from the Watts Bar 1 in the spring of 1999, they will be examined extensively, both in a nondestructive and destructive manner.

Therefore, prior to the initiation of a production mission, DOE will have experience and irradiation data from a broad range of tests, including the lead test assemblies that are prototypic of the production TPBAR design. The cumulative DOE experience with the target technology has provided high confidence that the design and operation of the TPBARs will be within the defined safety and environmental limits.

Issues involving the environmental effects of handling, storing, and transporting radioactive materials in the United States, including tritium, have been well analyzed and documented and are generally well understood. There are no new issues raised by the transportation of TPBARs, as compared to other radioactive materials, other than design-specific accident responses. Conservative analysis of accident responses has been made in the CLWR EIS using the design and experience base noted above.

19.10 The commentor, referring to a statement made in Section 3.1.2 of the CLWR Draft EIS that, "The tritium produced would be bound to the getter and extracted only after heating to a high temperature...," questions whether there is no release potential of any form of tritium that contributes to the doses calculated in the EIS. Even with the very conservative assumptions used to assess impacts from the potential leakage of tritium from the TPBARs, the estimated impacts on human health are very small.

Comment Summarized: 143-5

Response: The performance of the getter is such that there is virtually no tritium in the TPBARs available in the form that could permeate through the TPBAR cladding. For conservatism, the CLWR EIS makes the assumption that 1 Curie of tritium per TPBAR per year could permeate through the cladding and be released to the environment. It is also assumed, as an abnormal event, that two TPBARs could fail in a core load of TPBARs and that the entire tritium inventory is released to the reactor coolant and then to the environment. This is extremely conservative, since there has not been a single burnable absorber rod failure in the last 18 years, during which time over 500,000 such rods made by Westinghouse have been irradiated. Notwithstanding these conservative assumptions, the assumed tritium releases give rise to the doses calculated for workers and the public and are included in Volume 1, Section 3.1.3, Chapter 5, and Appendix C, Section C.3.4 of the CLWR EIS. Even with the very conservative assumptions used to assess impacts from the potential leakage of tritium from the TPBARs, the estimated impacts on human health are very small.

19.11 Referring to Appendix A, page A-12 of the CLWR Draft EIS, the commentor states that the text does not go into any detail about the differences between using TPBARs and standard burnable poison rods. The commentor suggests that more details be provided.

Comment Summarized: 143-9

Response: For the purposes of this EIS, a qualitative description of the rods is considered to be sufficient to demonstrate the significance of the design to the environmental impacts. These descriptions are provided in Volume 1, Section 3.1.2 (including Table 3-1), and Appendix A, Sections A.2 and A.3. Further details on the differences between the two types of poison rods (burnable absorber rods versus tritium-producing burnable absorber rods) are discussed in the *Tritium Production Core Topical Report* (WEC 1998), which has been provided to the NRC and which will become the basis of the safety review, should tritium be produced in any of the TVA reactors. It should be noted that neither rod contains fissile material or is radioactive prior to reactor operation.

19.12 In response to a statement made by Steven Sohinki of DOE at the public hearing, the commentor asks why DOE says that TPBARs would be under less stress in the reactor core than standard burnable absorber rods.

Comment Summarized: 704-5

Response: As discussed in Volume 1, Section 1.9 of the CLWR EIS, the only two early observed failures among standard burnable absorber rods were attributed to slumping of the absorber material, a failure mechanism that cannot occur in the TPBARs. Therefore, assuming that the TPBARs are designed and fabricated under the same standards and with the same margins to failure as the standard burnable absorber rods, it could also be assumed that the TPBAR failure rate would be similar to the standard commercial burnable absorber rods.

19.13 The commentor, referring to a request previously made to DOE, reiterates the request for DOE to provide the State of Tennessee and interested stakeholders the TVA sampling data from the primary coolant at the Watts Bar Pilot Project, both before and during actual production of tritium. The commentor asks DOE to send the data as it becomes available. Measurements of tritium in particular should be provided. The commentor remarks that, since the TPBARs contain different materials than standard burnable absorber rods, other relevant neutron activation products should be included in the data. The commentor requests the detection limits and bounding statistics.

Comment Summarized: 127-5

Response: The requested information was provided by TVA to Mr. Monroe of the State of Tennessee on October 8, 1998. Additional information was provided on December 14, 1998.

19.14 A commentor asks who is going to fabricate the tritium rods that DOE plans to use in the Watts Bar reactor. The commentor asks whether DOE will examine the fabricator's past performance specifically with regards to cladding. The commentor notes that there is a massive decay going on with the cladding in the rods that will cut down on the production of electricity at Watts Bar and suggests that DOE is going to derate the plant even more.

Comment Summarized: 811-2

Response: DOE will issue a request for proposals to commercial fuel fabricators to determine who will fabricate the TPBARs. As part of the selection process, the fabricator's past performance with regard to cladding will be evaluated. The production of tritium does not impact the rated power of a CLWR.

CATEGORY 20: DECONTAMINATION AND DECOMMISSIONING

20.01 Two commentors ask who is responsible for the cleanup of the tritium production site. The commentor asks who will pay the additional cost.

Comments Summarized: 86-1, 707-14

Response: Any costs associated with the normal nuclear site decontamination and decommissioning are the responsibility of TVA. Any cleanup of tritium-related contamination is the subject of the contract negotiations between DOE and TVA.

20.02 The commentor states that the CLWR Draft EIS fails to include a comparison of the eventual costs of decontaminating and decommissioning Bellefonte as a nuclear site and as a fossil fuel electricity-generating plant—which it should do, since those are the two possible futures for the plant.

Comment Summarized: 702-16

Response: It is a well-established principle under NEPA that the purpose and need of a proposed action should delineate the limits of the reasonable alternatives to that action. That is, an alternative which does not accomplish the agency's goals is not a reasonable alternative. As explained in Volume 1, Chapter 3 of the CLWR EIS, the purpose of the EIS is to assess reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. DOE believes that the CLWR EIS discusses all of the reasonable alternatives for producing tritium in one or more CLWRs to satisfy national security requirements as directed by the President. The alternative of converting the Bellefonte reactors to fossil fuel electricity-generating plants is discussed in the CLWR EIS (see Volume 1, Section 1.5.2.4). As discussed in that section, TVA has completed a Final EIS for the Bellefonte Conversion Project (TVA 1997) which analyzes the reasonably foreseeable environmental impacts associated with converting the Bellefonte plants to fossil fuel plants. However, with respect to the CLWR EIS, conversion of the Bellefonte plants to fossil fuel electricity-generating plants would not accomplish DOE's purpose and need as stated in the CLWR EIS. As such, conversion of the Bellefonte plants to fossil fuel plants is not a reasonable alternative for the CLWR EIS and, thus, is not analyzed in the CLWR EIS.

20.03 The commentor thinks DOE and TVA should consider the long-term effects and the cleanup and the decontamination aspects of CLWR tritium production, which are all parts of the process, before starting such a project.

Comment Summarized: 707-18

Response: Volume 1, Section 5.2.5 of the CLWR EIS addresses the subject of decommissioning and decontamination. Section 3.2.1 delineates the underlying assumptions used in calculating decontamination and decommissioning of the tritium production CLWRs. The most important assumption is that the production of tritium at a CLWR is not expected to affect the radiological condition of the reactor at the end of its lifetime.

20.04 Two commentors question who would be responsible for the costs associated with decontamination and decommissioning of the Bellefonte reactor plant if it were completed and used for tritium production. One commentor is concerned with the cost of decontamination and decommissioning, stating that it will be high and that the issue is not addressed in the CLWR Draft EIS.

Comments Summarized: 41-11, 707-12

Response: Impacts associated with decontamination and decommissioning are assessed in Volume 1, Section 5.2.5 of the CLWR EIS. The eventual costs of decontamination and decommissioning would be the responsibility of TVA. See also the response to Comment Summary 20.01.

CATEGORY 21: REACTOR LICENSING ISSUES

21.01 The commentor asks whether TVA would expect the operational technical specification limits to remain the same under tritium production.

Comment Summarized: 705-1

Response: At this time, it is unclear whether the operational technical specification limits would remain as they are currently. As part of the license amendment to produce tritium, these limits will be reviewed by the NRC.

21.02 One commentor, referring to the 25-year-old design of the Bellefonte plant, suggests that an evaluation of the aged equipment (reactor vessel, instrumentation, wiring) be made to ensure that today's safety requirements are met. Another commentor opposes the use of Bellefonte as a tritium plant because the reactor design is old and outdated. The commentor thinks that using an outdated reactor design would place all of the people in the area in jeopardy from a potential accident.

Comment Summarized: 41-10, 49-1

Response: As discussed in Section 3.2.5.3 of the CLWR Draft EIS, the equipment at Bellefonte has been maintained in a lay-up mode. No fuel has been added to the reactor, and there has been no degradation of the reactor vessel. The NRC makes periodic inspections to verify that the lay-up procedures are being followed and that the conditions for the equipment defined by the plant procedures are maintained. The lay-up approaches and procedures used to maintain the equipment at Bellefonte are similar to those that were used at Watts Bar 1. Watts Bar is currently in its second operating cycle and has maintained an outstanding performance record since the start of operation. The NRC would review the "as built" condition of the Bellefonte plant, as well as updated design and safety information, prior to the start of operation. Some of the plant instrumentation, including the plant computer, would be upgraded prior to operation. Additional plant modifications would be implemented to bring the plant configuration up to today's safety and licensing requirements. The NRC also would hold public hearings and address concerns raised by the public prior to granting an operating license for either of the units.

21.03 The commentor raises the question of whether Watts Bar and Sequoyah will be available after the existing operating licenses expire. The commentor also states that it doesn't make sense to produce tritium until it is needed.

Comments Summarized: 94-3, 702-12

Response: The CLWR EIS addresses license renewal in Volume 1, Section 5.2.4.1. DOE assumes that the reactors will be capable of meeting the NRC licensing extension requirements. In the event that a reactor is unable to meet these requirements, it is assumed that other reactors will be available. DOE also has the option of increasing the production of tritium during the life of the existing reactors in the event that life extension is not a viable option. The commentor references another scenario concerning when the tritium is required. DOE is required to accept the mandates of the President in the Nuclear Weapons Stockpile Plan. If these requirements are reduced, DOE has the flexibility of reducing the level of irradiation services purchased from TVA.

21.04 The commentor asks when the NRC's review of the Production Core Topical Report and its plant-specific reviews will be available to the public.

Comment Summarized: 704-13

Response: The safety evaluation report on the Production Core Topical Report is expected to be issued by the NRC in March 1999. The plant-specific application for a licensing amendment will be submitted for review after the Record of Decision for the CLWR EIS is published.

21.05 The commentor opposes tritium production at a CLWR because the NRC may delay any DOE programs assigned to a CLWR.

Comments Summarized: 14-2, 504-2

Response: There is no credible evidence that the NRC will intentionally delay a licensing associated with the production of tritium in a civilian nuclear plant. DOE has been working with the NRC for the last three years. DOE and the NRC have entered into a Memorandum of Understanding that governs the roles and responsibilities of each agency. The NRC acted in a timely manner in approving the use of the lead test assemblies currently in place at the Watts Bar facility. NRC has very specific and important safety requirements that must be met before any licensing actions can occur. If questions arise, it is anticipated that there will be more than one reactor alternative DOE can rely on in order to produce tritium in a timely manner. DOE's schedule allows sufficient time for licensing issues to be resolved satisfactorily.

21.06 The commentor believes there are uncertainties in the ability to obtain a license for CLWR tritium production based on public concerns over safety and environmental hazards resulting from releases of tritium and public discomfort with the commingling of military purposes in a civilian reactor.

Comments Summarized: 45-2, 503-2

Response: The commentor is correct that, as with any project, there are uncertainties. The purpose of the CLWR EIS is to address environmental impacts of the production of tritium in a CLWR. The issues raised by the commentors will be taken into consideration during the final decisionmaking process and will be reflected in the Record of Decision. DOE believes that the issues raised by the commentors, while accurate, will not preclude the CLWR as a viable option to produce tritium. The NRC does not issue licenses based on public opinion. The NRC considers public concerns in the licensing process; however, they make decisions based on safety.

21.07 A commentor asks what the NRC time line for licensing would be once a decision has been made to use Watts Bar for tritium production.

Comment Summarized: 812-2

Response: A license amendment would be necessary, and one is expected to be submitted to the NRC by the Spring of 2000.

21.08 A commentor asks whether the license to finish the Bellefonte unit is still in effect.

Comment Summarized: 810-1

Response: Yes. TVA has construction permits from the NRC for the completion of the Bellefonte Nuclear Plant Units 1 and 2 that are valid until October 1, 2001, and October 1, 2004, respectively.

CATEGORY 22: SAFEGUARDS AND SECURITY

22.01 Commentors have suggested that the use of civilian reactors will make them attractive targets for attack by terrorists and foreign powers. The commentor states that, since the Sequoyah Plant is located only 7.5 miles from Chattanooga, it is a comparatively attractive target for terrorists. Furthermore, the commentor points out that such a CLWR would be the "weak link" in the nuclear weapons complex security system and, accordingly, such an attack should be analyzed by the CLWR EIS. Another commentor indicates the EIS, at a minimum, should assume the CLWR would be bombed by a foreign power nuclear weapon and the impacts of such an action should be included in the EIS. Another commentor indicates that it is unreasonable for DOE to dismiss accidents resulting from sabotage as speculative. The World Trade Center bombing proves that the United States is no longer impervious to terrorist activities. Another commentor states that DOE does not consider

the possible attack on the transport of TPBARs from the production site to either the Savannah River Site or the Richland, Washington, site. Another commentor suggests that the conclusion reached in the CLWR Draft EIS that no environmental impacts are expected as a result of compliance with the NRC and DOE safeguard and security provisions illustrates the cursory analysis in the EIS.

Comments Summarized: 6-4, 13-4, 41-2, 80-2, 94-20, 116-7, 136-1, 702-13

Response: Facilities and activities associated with the production of tritium are required to comply with the stringent security provisions of DOE Orders 5632.1C and 5633.3A. These Orders require a graded protection for all safeguard and security interests, classified matter, property, and sensitive information from theft, diversion, industrial sabotage, radiological sabotage, espionage, unauthorized access or modification, loss or compromise, or other hostile acts which could cause unacceptable adverse impacts on national security, our business partners, or on the health and safety of employees and the public. The DOE Orders further require a facility associated with the production of tritium to provide protection against a design-basis threat. DOE has further security provisions specifically designed to ensure that the transport of materials, equipment, and articles utilized in the defense mission are not subject to sabotage, terrorism, or mishandling. Transportation of national defense-sensitive materials must comply with the extensive provisions of DOE Order 5610.14. Similar to facility security requirements, these transportation security requirements necessitate that DOE guards against a design-basis threat.

In order for a CLWR to produce tritium, it would be required to comply with the NRC and DOE security requirements. Requirements for developing a safeguards and security system sufficient to protect against a design-basis threat may be found in 10 CFR Parts 73 and 74. Prior to the operation of any TVA reactor to produce tritium, compliance with these regulatory requirements must be demonstrated to NRC's satisfaction.

The safeguard and security procedures of the TVA facilities have already been reviewed for the Lead Test Assembly program (an ongoing program which is currently testing 32 TPBARs in TVA's Watts Bar reactor) and have been found to be sufficiently protective of Federal property, employees, and the general public. As indicated in Volume 1, Section 5.2.10 of the CLWR EIS, no environmental impacts are expected as a result of compliance with both NRC and DOE safeguard and security provisions. Prior to the placement of additional, production-quantity TPBARs in any of the TVA reactors, an additional, similar, site-specific review of security procedures would be conducted. This analysis would include transportation of all materials associated with the program. If it were determined that the requirements of either the NRC or DOE security provisions could not be met, additional procedures would be implemented to achieve compliance with these requirements.

DOE has presented what it believes to be a site-specific probabilistic assessment of severe accidents, including the effects of external events such as fires, floods, and earthquakes. The severe accident analysis in the CLWR EIS includes a loss-of-coolant accident which results in core overheating, fuel melting, loss of containment, and release of radionuclides to the environment.

It is not possible to assign a probability to an attack by either a terrorist or a foreign nuclear power. Such analysis is considered to be beyond the state-of-the-art of probabilistic risk assessment. However, if one were to assume such an event occurred, the environmental impacts resulting from such an event are expected to be similar to the severe accident scenario which is analyzed in the CLWR EIS and which is presented in Volume 1, Section 5.2.1.9.2 for the Watts Bar Nuclear Plant, Section 5.2.2.9.2 for the Sequoyah Nuclear Plant, and Section 5.2.3.9.2 for the Bellefonte Nuclear Plant.

CATEGORY 23: COST ISSUES

23.01 The commentor asserts that the ratepayers in Tennessee are ultimately responsible for the costs currently being incurred by TVA for the construction of Bellefonte (TVA issues bonds, but the bonds are the responsibility of the ratepayers). The commentor states that, as a result, the Federal Government's argument that it already owns the TVA plants is thin.

Comment Summarized: 704-12

Response: As explained in Volume 1, Section 1.3.6 of the CLWR EIS, TVA was established by an Act of Congress in 1933, as a Federal corporation. All of the TVA reactors are the property of the United States.

23.02 A commentor expresses the opinion that DOE has significantly underestimated the cost associated with the CLWR option and that these estimates should be subjected to an independent third-party review. Another commentor is concerned about cost overruns in view of TVA's history.

Comments Summarized: 503-3, 600-1, 800-2

Response: The TVA estimate to complete Bellefonte Unit 1 has undergone several reviews by independent organizations, including Bechtel, Ebasco, and Fluor Daniel. These reviews have confirmed the estimate. The total life cycle cost of the CLWR option includes not only the cost to complete Bellefonte, but also all other DOE program costs, such as the completion of the Tritium Extraction Facility and the cost of shipping irradiated TPBARs from the reactor facility to the Tritium Extraction Facility. The capital costs to complete Bellefonte are fixed under TVA's proposal. Should any additional monies be needed to complete the reactor, TVA would be responsible for the additional cost. The TVA Bellefonte offer includes the use of the Watts Bar Unit 1 reactor at no additional cost to DOE. Use of both of these reactors would meet START I requirements, including any tritium requirements associated with replenishing the tritium reserve. [See also the response to Comment Summary 03.03.] DOE management issued an official summary of the cost for the two options, including life cycle costs (DOE 1998c). This official DOE summary showed the Bellefonte offer to be significantly less expensive than the APT.

23.03 The commentor asks, since DOE and the TVA plants are government-owned, when will everybody in the nation be responsible for TVA's $29 billion in debt, and how soon can ratepayers expect a rate reduction from the current TVA debt (i.e., why should the ratepayers be responsible for the proposed action, which they will be, since TVA has so magnanimously offered some of the money they will be making on the production of electricity to DOE, and why isn't the rest of the nation paying for the proposed action?).

Comment Summarized: 623-2

Response: TVA's $29 billion debt financed total construction needs, not just for the nuclear program construction. This debt is not the responsibility of the U.S. Government and is not part of the national debt. TVA's power program is financially self-sufficient and relies on bond proceeds and revenues from the sale of power. Since TVA bonds are not the obligation of the U.S. Government, they are not part of the national debt. TVA's Board has already established a cap on the outstanding debt and is implementing a 10-Year Business Plan that will reduce the $29 billion amount by one-half by the end of Fiscal Year 2007. This will allow TVA to attain a competitive, reduced delivered price of power by the end of the plan period. The TVA-proposed arrangement with DOE to complete Bellefonte for tritium production would allow for the effective use of a TVA asset and would result in a significant benefit to all TVA ratepayers, both in debt reduction and in reduced operating costs. The Board of Directors will continue to review TVA's power rates annually and make adjustments based on sound business decisions.

23.04 The commentor asks who would benefit from electricity sales revenues from a completed Bellefonte Nuclear Plant—the taxpayers, TVA, or DOE?

Comment Summarized: 700-4

Response: The benefit from electricity sales revenues at Bellefonte could be split between TVA and DOE, depending on the outcome of contract negotiations. Since DOE funding to complete Bellefonte would come from Congress, any revenue returned to DOE to offset initial expenditures would benefit U. S. taxpayers. Any revenue returned to TVA would benefit TVA and the TVA ratepayers.

23.05 The commentor expresses his belief that cost overruns are likely if TVA plants are used for tritium production. The commentor requests DOE to guarantee that the CLWR Final EIS will contain more discussion and analysis of the potential risks and consequences of cost overruns. The commentor states that not doing so would be a mischaracterization of the NEPA process.

Comment Summarized: 700-10, 803-8

Response: TVA believes the estimate to complete Bellefonte is accurate and conservative. This estimate has been reviewed by several independent outside organizations, including Fluor Daniel, Ebasco, and Bechtel. TVA's 10-Year Business Plan does not assume any benefit from the completion of Bellefonte and sale of electricity from the plant. To the extent the plant generates positive cash flow, TVA's 10-Year Business Plan objective would be realized earlier than projected. Should cost overruns occur, the ratepayer would see no negative impact until the cost to complete is greater than the cumulative net cash flow generated from power sales. The probability of negative socioeconomic impacts is therefore minimized and considered negligible.

23.06 The commentor is disconcerted as a TVA ratepayer to learn that, first, Chairman Crowell stated in TVA's 1996 Integrated Resource Plan that TVA will not engage in further nuclear power plant construction without a full partner, and now, under one of DOE's tritium production scenarios, TVA would invest $4.5 billion (essentially its current expenditures for construction of Bellefonte) into the partnership with DOE, resulting in someone else (DOE) completing the reactor at no additional cost to the ratepayers. The commentor believes DOE's CLWR tritium production proposal is nothing more than a thinly veiled attempt to subsidize TVA's attempts to complete the Bellefonte reactor with taxpayer money.

Comment Summarized: 700-17

Response: DOE's purpose and need, as described in the CLWR EIS, is to provide a source of tritium and not to complete Bellefonte. DOE would only select the Bellefonte option if producing tritium at Bellefonte is in the best interest of the United States. TVA's proposal for the completion of Bellefonte is fully consistent with TVA Chairman Crowell's statements regarding future nuclear power plant construction.

23.07 The commentor expresses his belief that DOE needs to understand how delicate and fragile the contractual situation is with TVA's distributors, as well as the liabilities related to TVA's ability to meet the obligations of its 10-Year debt [reduction] plan and the restructuring of the electric utility environment. The commentor further states that these issues are significant and should be addressed socioeconomically to evaluate their long-term implications for the Valley and for U.S. taxpayers. Another commentor asks whether residents of Scottsboro would see their rates go up or down as a result of tritium production at Bellefonte.

Comment Summarized: 700-18, 806-2

Response: TVA believes the estimate to complete Bellefonte is accurate. This estimate has been reviewed by several independent outside organizations including Fluor Daniel, Ebasco, and Bechtel. In the unlikely

event of a cost overrun, TVA would delay debt reduction from its currently planned level. The revenues from the sales of electricity generated by Bellefonte likely would offset the amount of delay. These revenues are not realized in TVA's current debt reduction program. TVA would use these revenues to offset any cost overrun. TVA does not envision any impact to the ratepayer.

23.08 The commentor asks if TVA's offer for tritium production includes a fixed price.

Comment Summarized: 706-2

Response: TVA's offer to produce tritium at Bellefonte is a fixed price to DOE.

23.09 The commentor expresses the opinion that the EIS would benefit from including more information about the actual costs of the various alternatives and the implications of the costs for the specific economic proposals being considered (e.g., if the project costs $1.9 billion, who will be responsible for supplying the rest of the money if the costs exceed the fixed price?).

Comment Summarized: 706-3

Response: Actual costs of the various tritium production alternatives are not part of the EIS process. However, DOE has issued an official cost summary that compares tritium production alternatives, including life cycle costs (DOE 1998c).

23.10 Commentors ask whether TVA plans to pass on the cost of an overrun on its fixed price contract with DOE to ratepayers and, if not, whether TVA is subsidized by some other means.

Comments Summarized: 703-11, 704-16, 706-4

Response: TVA believes the estimate to complete Bellefonte is accurate and conservative. This estimate has been reviewed by several independent outside organizations including Fluor Daniel, Ebasco, and Bechtel. TVA's 10-Year Business Plan does not assume any benefit from the completion of Bellefonte and sales of electricity from the plant. To the extent the plant generates positive cash flow, TVA's 10-Year Business Plan objective would be realized earlier than projected. Should cost overruns occur, the ratepayer would see no negative impact until the cost to complete is greater than the cumulative net cash flow generated from power sales. The probability of negative socioeconomic impacts is, therefore, minimized and considered negligible.

23.11 The commentor is concerned about TVA's debt, suggesting that maybe TVA should take a little breather before starting another project and incurring more debt.

Comment Summarized: 707-11

Response: The funds needed to complete Bellefonte would be received from DOE. There would be no additional TVA funding needed to complete Bellefonte.

23.12 A commentor asks how the $2.9 billion will be dispersed if tritium production takes place at the Watts Bar plant.

Comment Summarized: 816-2

Response: The commentor misspoke; the estimated dispersement presented at the December 14, 1998, meeting was $1.9 billion. The procurement process is ongoing. It is impossible to determine how much money TVA might receive until the negotiations are complete.

23.13 Several commentors express disagreement with spending money for tritium production. Commentors opine that money would be spent better on social needs, education, environmental restoration, and other matters. Some commentors opine that the CLWR program was an effective use of taxpayers' money.

Comments Summarized: 2-3, 3-2, 7-3, 40-1, 53-3, 84-4, 99-3, 103-4, 108-2, 112-2, 115-1, 119-3, 125-2, 137-7, 141-2, 208-5, 212-8, 223-1, 239-4, 248-4, 250-5 621-2, 707-8, 712-6, 828-2

Response: Congress determines how funds are allocated. DOE spends monies consistent with Congressional direction. DOE is not in a position to make the difficult tradeoffs that may be required between alternative Federal programs and spending priorities. The issue of spending money for tritium production is beyond the scope of the CLWR EIS.

23.14 The commentor questions whether the $1.9 billion to complete Bellefonte Unit 1 included the costs of TPBAR transportation and the cost of the extraction facility. The commentor also questions whether TVA is a Government agency.

Comments Summarized: 86-10, 501-3

Response: Official DOE cost estimates for both the APT and the CLWR were made available at the CLWR public hearings. Additional copies of those cost estimates are available by contacting the CLWR program office. The $1.9 billion figure cited by the commentor is a fixed-price quote of the investment cost to complete the Bellefonte Unit 1. The costs associated with TPBAR transportation and the extraction facility are included in the official DOE cost estimate. As explained in Volume 1, Section 1.3.6 of the CLWR EIS, TVA was established by an Act of Congress in 1933 as a Federal corporation. All of the TVA reactors are the property of the United States.

23.15 Several commentors express support for the CLWR over the APT due to lower costs. Some commentors question whether the cost comparisons between the APT and the CLWR were equitable. One commentor asks what percentage of the accelerator program would pay for the design.

Comments Summarized: 4-10, 44-10, 45-8, 90-1, 114-1, 501-12, 605-1, 702-5, 713-2, 719-2

Response: Official DOE cost estimates for both the APT and the CLWR were made available at the CLWR public hearings. Those official cost estimates are DOE's best estimates of the costs for both the CLWR and the APT. Any assumptions and basis for analysis in developing those cost estimates are contained within the cost estimates. Cost issues associated with the CLWR and the APT are beyond the scope of the CLWR EIS.

23.16 Several commentors request that DOE be explicit concerning the costs associated with tritium production. Another commentor requests that the costs associated with spent fuel management be included in the EIS. Another commentor asserts that cost should not be the major factor in determining where tritium is produced. Another commentor asks whether DOE economic analysis includes the costs of pursuing the CLWR and APT options as both primary and backup alternatives to each other.

Comments Summarized: 127-3, 143-1, 245-2, 501-13, 504-5, 700-3, 702-4

Response: The CLWR EIS was prepared in accordance with NEPA, the Council on Environmental Quality's regulations on implementing NEPA (40 CFR Parts 1500 through 1508), and DOE's NEPA implementation procedures (10 CFR Part 1021). None of these require inclusion of a cost analysis in an EIS. As discussed in Volume 1, Section 3.2.1 of the CLWR EIS, the basic objective of this EIS is to provide the public and DOE decision-makers with a description of the reasonable alternatives and their potential environmental impacts.

While costs could be an important factor in DOE's decision regarding the production of tritium in a CLWR, the focus of an EIS is on the environmental consequences. DOE has performed several cost analyses on the various proposals associated with the production of tritium and made these cost analyses available to the public at the three public hearings DOE held in October, 1998. DOE is pleased to provide the public with these analyses upon request.

23.17 One commentor expresses concern regarding a number of issues related to costs: that costs to complete Bellefonte were underestimated and not subjected to independent third-party review, while the APT costs have been reviewed; that costs would overrun the TVA estimated cost of $2.44 billion to complete the cost of the Bellefonte 1 reactor; that the Government Accounting Office states that TVA estimates are very unreliable; that another utility estimates over $4 billion would be required to complete Bellefonte; that Bellefonte would not meet START I tritium requirements; that there is serious question concerning the ability of Bellefonte to generate sufficient revenues to offset costs; and that Watts Bar and Sequoyah, although discussed at length, are being withdrawn.

Comments Summarized: 45-3, 503-4

Response: The TVA estimate to complete Bellefonte Unit 1 has undergone several reviews by independent organizations, including Bechtel, Ebasco, and Fluor Daniel. These reviews have confirmed the estimate. The $2.44 billion cited in the comment is the total life cycle cost of the CLWR option, which includes not only the cost to complete Bellefonte, but also all other DOE program costs, such as the completion of the Tritium Extraction Facility, and the cost of shipping irradiated TPBARs from the reactor facility to the Tritium Extraction Facility. The capital costs to complete Bellefonte are fixed under TVA's proposal. Should any additional monies be needed to complete the reactor, TVA would be responsible for the additional cost. The TVA Bellefonte offer includes the use of the Watts Bar Unit 1 reactor at no additional cost to DOE. Use of both of these reactors would meet START I requirements, including any tritium requirements associated with replenishing the tritium reserve. [See also the response to Comment Summary 03.03.] DOE management issued an official summary of the cost for the two options, including life cycle costs. When considering the life cycle costs of the completion and utilization of the Bellefonte facility for producing tritium, the revenues to be generated from the sales of electricity, which TVA would share with DOE, would offset the initial, up-front costs. These up-front costs, however, are quite sizable. The Watts Bar/Sequoyah offer gives DOE an attractive alternative based upon an annual fee for irradiation services, without any large up-front costs. In addition, this flexible offer becomes even more attractive, considering the possibility of smaller, future tritium requirements as a result of additional cuts in the size of the nation's nuclear weapons stockpile.

23.18 The commentor states that the Congressional Research Service review raises a serious question on the ability of Bellefonte to generate sufficient revenue to offset operating costs, much less amortize construction.

Comment Summarized: 503-12

Response: TVA's Watts Bar 1, Sequoyah 1 and 2, and Browns Ferry 2 and 3 nuclear units generate power at an operating cost significantly lower than current market price for firm baseload power. TVA expects the same level of low-cost efficient generation at Bellefonte 1. With the margin between the cost of generation at a nuclear unit and the market price of power, TVA would be able to cover both fixed and variable operating costs of generating power at Bellefonte 1, while also reducing TVA debt and sharing revenue with DOE.

23.19 The commentor wants to know what guarantees exist that TVA can finish completion of Bellefonte within the stipulated costs. The commentor asks if all funding for the completion of Bellefonte will be up front prior to completion and before an NRC license is obtained.

Comment Summarized: 506-3

Response: In response to the Secretary of Energy's request that TVA provide its best and final offers, DOE received several proposals for the completion of the Bellefonte facility (see Volume 1, Section 1.1.4 of the CLWR EIS). All of these proposals were for a fixed price, with varying programs for completion funding by DOE. These programs range from two annual up-front payments to six such payments. In all instances, funding would be prior to the operation of this facility and, in all probability, most funding would be prior to obtaining an NRC operating license.

There are no guarantees for the completion of the facility within the stipulated costs. It should be noted, however, that these cost projections are for the completion of a facility which is already 90 percent complete. Furthermore, the cost proposals have been reviewed by three separate, independent, outside groups.

23.20 The commentor expresses belief that the capital costs for the Bellefonte reactors will be significantly more than for the APT and that life cycle costs will be comparable.

Comment Summarized: 503-6

Response: Cost issues associated with the CLWR and the APT are beyond the scope of the CLWR EIS. Nevertheless, official DOE cost estimates for both the APT and the CLWR were made available at the CLWR public hearings (DOE 1998c). Those official cost estimates are DOE's best estimates of the costs for both the CLWR and the APT. Any assumptions and basis for analysis in developing these cost estimates are contained within the cost estimates.

23.21 The commentor asks whether the fixed price for completing the Bellefonte plant would also include defense of the project against any nuclear activist suits or intervenors.

Comment Summarized: 506-4

Response: The costs for potential litigation are not within the scope of the CLWR EIS.

23.22 The commentor states that using the Watts Bar plant only for tritium production clearly is the least expensive reactor option and asks why TVA let this option expire. The commentor suggests TVA's reason was to preclude the lower-priced option (Watts Bar only) so that Federal monies could be obtained to finish the Bellefonte plant. Another commentor asks why TVA did not include negative EIS comments in their latest offer letter to DOE.

Comments Summarized: 232-3, 700-2, 806-5

Response: DOE is not in a position to explain TVA's decisions during the procurement process. As discussed in Volume 1, Section 1.1.4 of the CLWR EIS and in the response to Comment Summary 06.03, TVA resubmitted a proposal for irradiation services at the Watts Bar plant and the Sequoyah plant after the issuance of the CLWR Draft EIS.

23.23 A commentor feels that, as part of the decision process, TVA and DOE should compensate local government, thereby helping local ratepayers and taxpayers. Another commentor asks what effect irradiation services at the Watts Bar and Sequoyah plants would have on ratepayers, and whether electric rates would change. Another commentor asks whether residents of Rhea County would receive a tax break.

Comments Summarized: 230-2, 802-2, 809-1

Response: If Watts Bar and Sequoyah were selected, DOE expects to enter into an interagency agreement with TVA under the Economy Act, discussed in Volume 1, Section 1.1.4 of the CLWR EIS. Under that

agreement, DOE would pay TVA for the cost of tritium production. This would have no effect on ratepayers or taxpayers. If Bellefonte were selected, the benefit from electricity sales revenue could be split between TVA and DOE, depending on the outcome of contract negotiations. Because DOE funding to complete Bellefonte would come from Congress, any revenue returned to DOE to offset initial expenditure would benefit U.S. taxpayers. Any revenue returned to TVA would benefit the agency and its ratepayers.

23.24 A commentor asks for clarification regarding the numbers given for the Watts Bar and Sequoyah plants in the presentation. The commentor also asks about the breakdown that led to TVA's estimate of $85 million for irradiation services. The commentor suggests that TVA is inflating the taxpayer costs to make the Bellefonte alternative more attractive.

Comment Summarized: 803-1

Response: Negotiations are currently ongoing between TVA and DOE to determine the cost of irradiation services. Details of the negotiation process are procurement-sensitive.

23.25 A commentor asks how TVA can reduce its estimated costs for completing the Bellefonte plant for tritium production. The commentor asks whether ratepayers would have to pay more to make up the $.5 billion difference.

Comment Summarized: 806-1

Response: In the latest proposal, TVA assumes a share of the costs to complete Bellefonte. TVA would borrow money to do this; the rates would not be increased, but the debt pay-down plan would be delayed.

23.26 A commentor asks whether TVA is paying back the principal on its debt yet.

Comment Summarized: 810-2

Response: The principal on the Bellefonte debt is included as part of the 10-year debt package that is currently being paid.

23.27 A commentor asks whether DOE has determined over the 25- or 30-year production period which reactor method is the most economical way to produce tritium.

Comment Summarized: 810-3

Response: Because the procurement process in ongoing, definitive costs have not been finalized yet and, therefore, it is not possible to say with absolute certainty which of the reactor alternatives is the most economical. Based on current estimates on a life cycle cost basis, TVA's proposal to complete Bellefonte and produce tritium is the least costly alternative, but in the near term, the irradiation services proposal to use Watts Bar and Sequoyah is less costly than completing and operating Bellefonte.

CATEGORY 24: MISCELLANEOUS

24.01 The commentor questions whether DOE and TVA can effectively communicate.

Comment Summarized: 501-8

Response: The effectiveness of communication between TVA and DOE is beyond the scope of the EIS.

24.02 The commentor expresses concern that nuclear energy is a complicated process and wonders if using highly complicated processes makes mistakes and failures more likely.

Comment Summarized: 707-13

Response: The CLWR EIS assesses the environmental impacts associated with tritium production in one or more CLWRs. Included in the EIS is an assessment of the probabilities, consequences, and risks associated with potential accidents. Currently, tritium is being produced in Watts Bar 1 as part of the Lead Test Assembly demonstration. Results from that demonstration are confirming that tritium production in a CLWR is straightforward and safe.

24.03 The commentor asks if the amount of tritium now possessed by the United States is losing its efficiency or leaking somewhat and, if so, is there no way to prevent this loss.

Comment Summarized: 707-4

Response: Tritium is a radioactive form (or isotope) of the hydrogen atom and, like all radioactive isotopes, will spontaneously change into a different isotope (Helium-3) through a process called "radioactive decay." There is no known way to stop tritium from decaying.

24.04 The commentor questions, "What is the current uranium-235 enrichment, 4.0 percent? Why would DOE supply the higher-enriched uranium, and not the U.S. enrichment plants? Is it because of the uranium surplus at DOE?" The commentor wonders if releases from higher enrichment fuel would be greater.

Comment Summarized: 143-7

Response: As discussed in Volume 1, Appendix A, normal enrichment of fuel used in CLWRs is from 4.2 to 4.5 percent. Full production loading of TPBARS may require the use of slightly higher enriched fuel (4.6 to 4.9 percent). Such an increase would be allowed by the current NRC licenses (current NRC licensing provisions allow for up to 5 percent enrichment).

DOE has offered to provide TVA with any required uranium of higher enrichment levels to avoid causing TVA any cost increases for normal operations. DOE already has specific quantities of highly enriched uranium which could be blended down to the appropriate concentration levels (within the NRC licensing limitations), should such fuel be required. DOE has clarified this in Volume 1, Section 5.2.7 of the CLWR EIS. The somewhat higher enrichments and reduced fuel assembly burnups associated with the tritium production core, as compared to the conventional core designs, can influence the radiological source term used in the calculation of radiological emissions other than tritium during normal operation and accident conditions. The *Tritium Production Core Topical Report* (WEC 1998) quantified this effect and concluded that, overall, the fission product inventories were the same or lower in the tritium-producing core. Therefore, the analysis presented in the CLWR EIS, which does not account for the increased enrichment, is conservative.

24.05 The commentor asks how a one-year delay in completing construction at Bellefonte 1 would impact the schedule to complete the Tritium Extraction Facility by 2005. Another commentor questions why DOE would want to run the Tritium Extraction Facility furnaces within the top 90th percentile of their maximum temperature, and why there is no data in the CLWR Draft EIS that addresses recovery efficiency in the Tritium Extraction Facility.

Comment Summarized: 500-3

Response: The Tritium Extraction Facility construction is not related to the completion of Bellefonte. Therefore, any delay associated with completing Bellefonte would have no impact on the construction of the Tritium Extraction Facility. While specific comments regarding the Tritium Extraction Facility are beyond the scope of the CLWR EIS, these comments have been forwarded to the preparers of the Tritium Extraction Facility EIS for response and inclusion in the Tritium Extraction Facility EIS.

24.06 The commentor asks where the tritium produced by a CLWR would go and what would be done with it. Another commentor asks whether the tritium would be extracted immediately at the Tritium Extraction Facility or stored at the site.

Comments Summarized: 603-1, 629-2, 704-7

Response: As explained in Volume 1, Chapter 1 of the CLWR EIS, tritium produced at a TVA reactor would be shipped to the Savannah River Site for extraction from the TPBARs. This tritium would then undergo purification and would be loaded into the tritium reservoir for use in the nuclear weapons stockpile. Tritium would be extracted at the Tritium Extraction Facility as necessary to meet stockpile demands. The Tritium Extraction Facility would have the capability to store irradiated TPBARs until extraction is necessary.

24.07 The commentor remarks that the actual tritium extraction occurs in areas already overexposed to mismanagement. TVA would only expose special control rods and ship them to the extraction plant. It appears that this in no way adds significantly to any existing situation.

Comment Summarized: 103-2

Response: The potential environmental impacts associated with the irradiation of TPBARs at any of five TVA reactors are presented in the CLWR EIS. Following irradiation, TPBARs would be shipped to the proposed Tritium Extraction Facility that would be constructed at the Savannah River Site. As discussed in Volume 1, Section 1.5.2.2 of the CLWR EIS, a separate EIS has been prepared for this facility to evaluate the potential environmental impacts of the tritium extraction. A summary of the environmental consequences related to the construction and operation of the Tritium Extraction Facility appears in Section 5.3.4 of the CLWR EIS.

24.08 The commentor expresses the opinion that to establish a new use for civilian nuclear power reactors is counter to the growing worldwide consensus that nuclear power should be eliminated as a source of energy since it is inherently unsafe, uneconomic, and most importantly, unnecessary.

Comment Summarized: 110-6

Response: Whether there is any worldwide consensus regarding nuclear power is beyond the scope of the CLWR EIS. Nonetheless, the position for many of the world's governments in developed countries is that nuclear power will continue to play an important role in the next century in meeting substantially increasing energy demands and may be essential to cope with global warming. The construction of new nuclear plants outside of the United States continues to increase, especially in the Far East, to satisfy the rising demand for energy in the fast-expanding economies of Japan, the Republic of Korea, and China. The strengthening of nuclear safety is now an international collaborative effort. TVA takes its responsibility seriously to maintain competitive rates and growth in the Tennessee Valley while protecting the health and safety of the environment and the public; the performance records of its nuclear program support this priority. For example, last year TVA's nuclear plants generated 27 percent of the total TVA generation, allowing TVA to meet record peak demands during the summer and winter. TVA's operating nuclear plants have been named among the most efficient nuclear utilities in the country and as leaders in cost reduction.

24.09 The commentor states that, when his group of retired engineers, scientists, and physicists met in April of last year, someone told them there was absolutely no increase in any kind of disease, including cancer, in areas where TVA facilities are operating.

Comment Summarized: 620-2

Response: A National Cancer Institute survey in the *Journal of the American Medical Association*, March 20, 1991 (NCI 1991), showed no general increased risk of death from cancer for people living in the 107 counties containing or closely adjacent to 62 nuclear facilities. Included in the study were 52 commercial nuclear power plants, 9 DOE research and weapons plants, and 1 commercial fuel processing plant. TVA's Brown's Ferry and Sequoyah Nuclear Plants were included in this survey.

24.10 The commentor asks for clarification of a statement found in the CLWR Draft EIS Summary that indicates no design changes would be necessary to complete Bellefonte for tritium production. The commentor suggests clarification be added to the summary document.

Comment Summarized: 706-5

Response: Minor modifications would be required for radiological, security, and operational impacts. Additional radiological monitoring equipment such as portable monitors, discrete air samplers, and liquid scintillation counters would be procured, and air and water sampling station equipment would be installed for environmental monitoring. Some minor tooling modifications may be made to facilitate handling of TPBARs in the spent fuel storage pool. Also, some security enhancements would be made to accommodate storage of classified documents and TPBARs. However, no major modifications would be required for tritium production, as discussed in Section 3.2.5.3 of the CLWR EIS.

24.11 The commentor wants clarification that TVA will own the facility and at no time will it be sold or given to DOE.

Comment Summarized: 714-2

Response: TVA has no plans or intent to transfer ownership to DOE. Since TVA facilities such as Watts Bar and Bellefonte are government-owned, there is no reason to sell these facilities to DOE. As discussed in Volume 1, Section 1.1.1 of the CLWR EIS, DOE is only interested in the purchase of irradiation services, not the purchase of a reactor.

24.12 Commentors note editorial changes to be made to the CLWR Draft EIS, including the addition of words and sentences to clarify the text, the correction of the sequence of footnotes to some tables, the elimination of inconsistent terminology, and the correction of typographical or grammatical errors.

Comments Summarized: 89-1, 94-1, 146-4

Response: The text cited by the commentors has been revised. Additional edits have been made throughout the document as necessary. A list of sections affected by this type of revision is included in Volume 1, Section 1.9 of the CLWR EIS.

24.13 Commentors request clarification concerning the cumulative effects of using multiple reactors.

Comments Summarized: 146-23, 703-6

Response: Volume 1, Section 3.2.6 explains that the impacts of using more than one CLWR for tritium production can be determined by adding the impacts of each individual CLWR together. Tables 5-59, 5-60, and 5-62 in the CLWR Final EIS present the cumulative impacts at each site. For the sites with two potential units operating (Sequoyah, Bellefonte) the CLWR Draft EIS assumed that one of the units is operating in a tritium-producing mode while the other is operating in a normal electricity-producing mode. Tables 5-51 and 5-53 have been revised in the CLWR Final EIS to reflect tritium production in both units at the same time; the tables appear as Tables 5-60 and 5-62 in the CLWR Final EIS.

24.14 The commentor notes that the CLWR Draft EIS fails to list and examine mitigation measures for the increased risks due to the proposed action.

Comment Summarized: 116-5

Response: The CLWR Draft EIS discusses the need for mitigation measures right after the presentation of the impacts for each environmental resource, if such need is warranted. The CLWR Final EIS includes a summary of these discussions in a new Volume 1, Section 5.5.

24.15 The commentor requests information on the effect on the reactor physics and asks about the differences between regular burnable absorber rods and TPBARs.

Comment Summarized: 143-6

Response: Regular burnable absorber rods are depleted during a normal reactor cycle. That is, at the end of a normal operating cycle, regular burnable absorber rods no longer have the ability to absorb neutrons. In general, the TPBARs will continue to absorb neutrons throughout the entire fuel cycle. Since the TPBARs will absorb more neutrons than regular burnable absorber rods during a reactor operating cycle, they could require higher enriched fuel to have equivalent core performance characteristics at the end of the operating cycle. Prior to operating the reactor, the NRC will approve the analyses of specific tritium production reactor core configurations. NRC license holders must submit core reload analyses and demonstrate that core performance for a new core configuration, including tritium production cores, is within the licensing basis performance envelope for the plant. The NRC currently licenses CLWRs to operate with fuel enrichments up to 5 percent.

24.16 The commentor notes that Table 4-11 in the CLWR Draft EIS did not contain a reference to the source of the data presented in the table. The commentor recommends the inclusion of the reference.

Comment Summarized: 146-5

Response: The reference (TVA 1998e, now TVA 1998d) is shown at the bottom of Table 4-11 of both the Draft and Final versions of the CLWR EIS.

24.17 The commentor notes that the first assumption listed in Section 5.1.2 of the CLWR Draft EIS is not an assumption, but a statement concerning the conservatism of the model used. The commentor suggests that the statement be moved from the list of assumptions up into the paragraph which precedes the list of assumptions.

Comment Summarized: 146-8

Response: The list of assumptions provides numerous examples of how the analysis was conservatively performed. Part of this conservative approach was the use of computer models, which conventionally overestimate health risks associated with low dose rates. Thus, the inclusion of this passage within the assumptions list is deemed appropriate.

24.18 The commentor, referring to Sections 5.2.1, 5.2.3, 5.2.7, and Tables 5-46 and 5-47 of the CLWR Draft EIS, questions the consistency of the use of the terms "baseline" and "baseline configuration." The commentor recommends that the baseline assumed in Section 5.2.9 be stated explicitly and the tables be checked for consistency.

Comment Summarized: 146-22

Response: Volume 1, Section 5.2.9 and associated tables have been revised to reflect consistency in the use of the term "baseline" between text and tables.

24.19 A commentor asks if DOE and TVA are in Y2K [Year 2000] compliance.

Comment Summarized: 800-8

Response: All Federal agencies have a coordinated and aggressive program underway to ensure compliance with Y2K requirements so that they can enter the millennium without any disruptions to required activities. Y2K compliance is outside the scope of the CLWR EIS.

24.20 The commentor, referring to Table 5-32 of the CLWR Draft EIS, remarks that the table does not give units for the data presented. The commentor recommends that units be provided in the table.

Comment Summarized: 146-15

Response: Note "a" of Table 5-42 (Volume 1) of the CLWR EIS (Draft EIS Table 5-32), which is cited in the heading for each column of data, identifies the units as "Increased likelihood of cancer fatality per year."

24.21 A commentor asks what DOE would do if TVA were dismantled as a result of deregulation.

Comment Summarized: 800-7

Response: Speculation as to the continuance or dismantlement of TVA is beyond the scope of the CLWR EIS.

24.22 The commentor asks how many TPBARs were inserted into the Advanced Test Reactor.

Comment Summarized: 704-10

Response: Eleven.

24.23 The commentor, referring to the discussion of a "real" individual in Section 5.2.6 of the CLWR Draft EIS, recommends that information should be included concerning what is meant by placing the word "real" in quotes.

Comment Summarized: 146-17

Response: The term is often used by the NRC in their safety evaluations. The term "real" in quotations indicates that the dose is calculated for actual individuals living near the ISFSI, as opposed to a hypothetical individual. A hypothetical individual is used often in analyses when the results are purposely overestimated for conservatism. Such a hypothetical individual, for example, may be assumed to stand, completely exposed, at the worst possible location for radiological exposure. Volume 1, Section 5.2.6 is revised to include an explanation of a "real" individual.

24.24 A commentor asks what "point of departure" means as used in the slide presentation.

Comment Summarized: 800-1

Response: This phrase was used in the DOE slide presentation on December 14, 1998, to refer to the starting point of discussions between DOE and TVA on all the elements of the Watts Bar/Sequoyah proposal. In other words, DOE considers that TVA proposal negotiable.

24.25 A commentor notes that both the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) say they have Memorandums of Understanding with TVA that allow an exchange of paperwork instead of onsite inspections. The commentor asks where copies of these Memorandums of Understanding can be obtained.

Comment Summarized: 811-3

Response: According to TVA's Office of General Council, there are no specific memoranda of understanding between TVA and these agencies.

24.26 A commentor asks whether tritium production would shorten the life span of the Watts Bar or Sequoyah units.

Comment Summarized: 814-1

Response: As discussed in Volume 1, Section 3.2.1 of the CLWR EIS, tritium production is not expected to shorten the life span of the Watts Bar or Sequoyah plants.

24.27 A commentor asks how many organizations are qualified to do this job that did not want it. The commentor asks why TVA bid on DOE tritium production. The commentor asks why TVA had no competition.

Comments Summarized: 813-1, 815-1

Response: There are approximately 72 pressurized water reactors in the United States that potentially could be used for tritium production, as discussed in Volume 1, Section 3.2.2. It is unknown how many utilities are represented by that number. TVA bid on the DOE tritium production proposal because it felt that responding to DOE's request for proposals is in the best interest of TVA. With regard to why TVA had no competition, DOE will not speculate on why other utilities did not bid.

24.28 A commentor asks when the last environmental impact study was done that used Bellefonte as a nuclear reactor without tritium production.

Comment Summarized: 816-1

Response: The *Final Environmental Impact Statement Related to Construction of Bellefonte Nuclear Plant Units 1 and 2 at the Tennessee Valley Authority* was published in June 1974 (TVA 1974). TVA reviewed the continuing validity of this document in 1994. This document addressed construction and operation of Bellefonte Units 1 and 2 as nuclear-powered electrical generation facilities only, and did not address tritium production.

24.29 A commentor states that tritium is a weapons component, and DOE should be honest about that fact.

Comment Summarized: 835-3

Response: DOE recognizes that tritium is a component of nuclear weapons and addresses this point in Volume 1, Section 1.3.2 of the CLWR EIS. Within that section the following statement is made: "Tritium is not a fissile material and cannot be used by itself to construct a nuclear weapon. However, tritium is a key component of all nuclear weapons presently in the nation's nuclear weapons arsenal. Tritium enables weapons to produce a larger yield while reducing the overall size and weight of the warhead."

24.30 A commentor expresses concern about the impacts from tritium production on uranium mine workers and people living in the vicinity of uranium mines.

Comment Summarized: 835-4

Response: As indicated in Volume 1, Section 5.2.7 of the CLWR EIS, the enriched uranium that would be used for fuel assemblies in tritium production has already been mined and processed. Additionally, DOE may provide blended-down highly enriched uranium from its inventory that has been set aside for national security purposes. Section 5.2.7 discusses the environmental impacts associated with blending down this highly enriched uranium. No additional environmental consequences of any significance are expected from TPBAR fabrication activities other than the fabrication and assembly of TPBARs and the conversion of highly enriched uranium to commercial reactor fuel.

24.31 Several commentors ask why TVA's irradiation services proposal is for 25 years, when the original programmatic proposal was for 40 years. The commentor also asks whether the requirements changed.

Comment Summarized: 803-4, 808-4

Response: In the original request for proposals, DOE asks for a minimum 10-year contract for irradiation services. The commentor is correct that the programmatic plan calls for 40 years of tritium production. TVA has offered 25 years, anticipating that DOE may issue another request for irradiation services proposals at some time.

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